The Builder.

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Metals, Stone, Slate, &c., in Palace of Art and Industry.

GREAT Exhibition like that in the Palace of Art and Industry, is an opportunity for posting-up knowledge and gains, and an event from which a fresh spring may be made by each nation taking part in the gathering together and study of the materials, products, and works of mechanism and art, which are displayed. In no department of such an Exhibition can we feel uninterested; and none has greater claims on the attention of our readers, than that which includes the materials used in building. Our national resources here are great; and a high authority has stated our annual produce of minerals as having the value of 32,183,600*l.* We now proceed to the examination of that part of the Exhibition which represents such an amount of wealth.

In the entrance portion of the Eastern Annex, and in two open courts, are a large number of specimens of materials for building and mechanical engineering works, forming Class 1, that of "Mining, Quarrying, Metallurgy, and Mineral Products of the British Division of the Exhibition." They are so much crowded together that many of them are overlooked. Some of the materials are worked into forms, as chimney-pieces, to show ornamental adaptability; and certain products, or primordial manufactures, as those of clay, are to be found chiefly in Class 10, where several have been named by us. "Specimens of steel, made directly from cast-iron by Bessemer's process," catalogued in Class 32, "Steel Cutlery and Edge-Tools," form one of the most important *trophies* of the southern half of the eastern transept; where, in the variety of forms and uses, in or to which the material is applied, an answer is given to those who questioned the value of the invention, which should be conclusive. We are however at the Eastern Annex. At the entrance to it, and in the transept, are several maps and sections of the geological surveys of England and Ireland, and Mr. Mylne's map which we noticed on its publication, of the area round London. Mr. Mylne also exhibits a very interesting map of the tertiary and cretaceous districts of England, the north of France and Belgium, Holland and Denmark, with the coal areas, and the contoured depths of the adjacent seas, which he has compiled from the maps of Dufrenoy and Elie de Beaumont, Dumont, Bach, Forchhammer, the British and French Ordnance Surveys and Geological Surveys and Admiralty charts, Greenough, Godwin-Austen, Prestwich, Murray, and others. Adjoining this is a map, by Mr. J. W. Salter of the Jermyn-street Museum, coloured on a new principle, adopting the prismatic colours as a basis, with a view to secure uniformity in the maps of the geologists of different countries. The sooner understanding is come to on some other matters, the more may the researches in each country be made useful to the geologists of other countries. The French geologists deserve great praise. Besides the general map of France, there are maps of the separate departments; and it is most useful on entering the museum of Beauvais, to find in prominent position the map of the Seine et Oise, and the valuable collection of specimens of the rocks and fossils of that department. The Museum of the École des Mines, Paris, also is admirable for its extent and method of arrangement; as in many respects indeed, is the geological museum of the Jardin des Plantes. We were glad to learn, in Paris, that the museum first named, had been several times examined by the authorities of Jermyn-street, to whom we have heretofore offered suggestions. One hint deserving attention, would be that of exhibiting an ideal section of the earth's crust, with the names of the strata, printed on it, as they are given correspondingly by geologists of different countries: literal translation does not suffice.

Near the maps last spoken of, is placed a collection of mineral products from the Shropshire lead and copper mines, exhibited by the Rev. F. More. Besides felspar and china-stone ochres, oxide of manganese, and sulphate of barytes, the case contains Roman spades and pigs of lead. In the same neighbourhood is a case, devoted to aluminium, showing the progress already made in the application of that valuable metal and of its alloys. The metal is obtained from the double chloride of aluminium and sodium by fusion with sodium. Amongst its advantages, besides non-liability to tarnishing, is the lightness. By its use, a sextant which in brass would weigh 3lb. may be made to weigh 1 lb. 9 oz. It costs 40s. per lb. troy. The alloy of the metal with copper, called aluminium-bronze, contains five per cent. of aluminium, and costs 4s. 6d. per lb. avoirdupois. This alloy resembles gold in appearance; whilst it is stronger than iron. Keys are made of aluminium alloyed with two per cent. of nickel to increase hardness. Messrs. Bell, Brothers, of Newcastle-on-Tyne, are the exhibitors. As showing what our island contains, the collection belonging to Mr. T. A. Readwin, of gold ores from Merionethshire, is interesting. There are also shown ingots of Welsh gold, of 126 oz. 19 dwt., from 6 cwt. 21 lb. of quartz, the weekly yield. A large case at the top of the stairs, descending to the Annex, contains specimens of platinum, and various articles manufactured from it, as alembics and retorts used in the rectification or concentration of sulphuric acid. The usefulness of the metal in manufacturing chemistry, is now greatly increased by the process discovered by Mr. St. Claire Deville, using the intense heat of combined gases, by which it can be made to assume complete fluidity,—the refractory nature of the metal constituting its value in the arts. Messrs. Johnson, Matthey, & Company are the exhibitors. The value of the platinum in the case is 5,180*l.*; one ingot, weighing 3,200 ounces, being worth 3,840*l.* Besides the platinum, and gold and silver, the case contains iridium, palladium, rhodium, uranium, cadmium, selenium, tellurium, osmium, and ruthenium, and the elements called non-metallic, silicon and boron, in various states and combinations. The platinum is recommended for the points of lightning conductors. An alloy of iridium and osmium is used for pen-points. Used in photography are the nitrate of silver, neutral chloride of gold (for imparting a delicate tone to the prints), the cadmium, and the nitrate of uranium. The oxides of uranium are used for colouring glass. In a corresponding position to that of the case last described, is one devoted to specimens and illustrations of the manufacture of German silver-plating, and the applications of nickel and cobalt. It is exhibited by Messrs. Evans & Askin, of Birmingham.

Clays have been classified by Brogniart, into *fire-proof*, *fusible*, *calcareous*, and *ferruginous*. The samples in Class 1 of the British Division, comprise porcelain clays from the granite formations of Cornwall and Dartmoor; the Teignmouth pipe, or potter's, clay; the China-stone of St. Austell; the potter's clay of Poole and Wareham; the fire-clays, including the Stourbridge; and others. Clay and terra-cotta manufactures are represented in Class 1, chiefly by fire-bricks and retorts for various purposes. Mr. Walcott's retort-beds are believed to have an advantage of economy in the arrangement for returning the heat, absorbed by the mass of the brick-work, into the furnace to intensify combustion. The retorts are built three or four in a tier, with heat-passages between; and are heated by one fire, the temperature being uniform.

The Farnley Iron Company have in one of the open courts, a collection of pipes of excellent manufacture, ranging from those of small bore up to some of about 3 feet 6 inches diameter. In the same part of the Exhibition, Messrs. Knight, Bevan, & Sturge exhibit some of their large blocks of Portland cement concrete, for breakwaters, as used at Dover and Alderney. They are composed of nine parts of rubble to one of cement.

The building-stones, we have remarked in a previous notice, are few in number of specimens. We find however specimens from the millstone grit in the form of millstones, and from the "Farewell Rock" of Dean Forest; Buhr stones, French, dexterously put together in England; sandstones, and flags; dolomites; oolites; and limestones, including the hydraulic, lias, and others. The marbles and granites we shall speak of, shortly. No exhibition of such materials, other than a permanent collection in the open air, with the dates when the specimens were exposed cut upon them, could be of service to the extent required for the use in buildings. We more than once made such a suggestion, and we still consider there would be public advantage in providing a place and establishing such a collection in London, if not also in each other locality. The collection of different kinds of stone exhibited by Mr. S. Trickett shows that a great variety of stone is brought to the London market; and it may be referred to with advantage; though prices are not supplied to us. It is singular that amongst the number of dealers and manufacturers who offer cards and lists in the Exhibition, few give the information wanted. As to stone, for example, we want not only the cost at the quarry, and the additional charge for carriage; but, failing evidence of use, such information as that of the absorbing power of the stone. Oolite building stone from the Little Casterton Quarry, near Stamford, is exhibited by Mr. O. N. Simpson. The Ancaster stone is exhibited in the form of a font, by Mr. John Wilson of Grantham, who notes that the material has been in good preservation in buildings (of course not in London) four hundred years. A font in Bath stone is exhibited by Messrs. Rogers & Rawlings of Bradford-on-Avon. In the transept, is a pulpit in the Farleigh Down stone, showing what can be done for 50*l.* We question whether much of the work in very small foliated capitals, that is now executed, is worth the labour; considering the grain, which prevents the intended result, even in Bath stone. We may add that there is a good specimen of York landing from Summerley's quarry at Idle, near Leeds. It would measure about 13 feet 4 inches by 7 feet, and 4 inches thick. Of Greaves's blue-lias lime from Stratford-on-Avon, we have lately spoken. It has opinions quoted in its favour from Mr. E. Smith, of Woolwich Dockyard; Mr. John Roe; Mr. J. Brown of Birkenhead, who speaks of its value in setting masonry where exposed to a strong current; from Mr. T. Wicksteed, who used it at the East London Waterworks, in one part of the lime to eight of gravel; by the late Mr. Brunel and the resident engineers of the Great Western Railway, and others. Mr. E. Tuffley, of Avening, near Stroud, exhibits a model of a stair-

case in Painswick stone; and Messrs. Trickett & Holdsworth, of Horsforth, specimens of the Bramley Fall stone.

Messrs. W. & J. Freeman exhibit a small selection from the materials which they supply, the chief of which here are grey granites, shown in the form of a thick slab for a hall-table, and in columns, which are all well worked and polished. The Cheesewring Granite Company also exhibit their material, at the entrance to the Annex, as well as in Mr. Bell's obelisk in the nave. Good specimens of grey granite from the Craignair Quarries are exhibited by Messrs. D. H. & J. Newell of Dalbeattie, Scotland. Mr. A. Macdonald, of Aberdeen, is one of the chief exhibitors of the same material, grey, as well as of the red, blue, and pink granites. One column which he exhibits has the *frusta* of the shaft so well put together that the joints are barely perceptible; and the workmanship attracts much attention. It has been referred to admiringly in the French papers. The slabs exhibited are also excellent specimens: one which we measured was 8 feet 6 inches by 3 feet 7 inches. All these specimens are beautifully polished. The drinking fountain in the open court, depending chiefly on the material, is better in effect than the majority of the works in which decoration has been attempted. Polished red granite is exhibited also by the Ross of Mull Granite Company; and there are also granites from Ireland. The granites above named should be compared with the column in rose-coloured granite which there is, along with one of serpentine, in the Swedish Division. The shaft of the granite column is in one block, and is called 4 mètres in height and 40 centimètres in diameter. It was produced by convict labour. A fluted column, a candelabrum, a tripod, and other articles in blue-grey jasper of good workmanship, are exhibited in the Russian Department. Though we are not reviewing the Foreign Division of the Exhibition, we ought to allude to the works, in the French Division, of Mr. Hermann, who produced the fountain, in granite of Brittany, lately mentioned by us as erected in the Champs-Élysées, and which was intended for the present Exhibition. Granite, porphyry, and jasper are wrought by Mr. Hermann, according to the French papers, by the aid of a newly-discovered black diamond. His first productions were simply for portions of the machinery for pounding chocolate; but he now exhibits, besides these, works in jasper of Savoy, as vases, with bronze ornaments, which are noteworthy as works of *art* in every sense of the word.

Returning to the entrance to the Eastern Annex, we find numerous specimens of their beautiful material exhibited by the Lizard Serpentine Company, some of them being worked into ornamental forms. One of these is a chimney-piece, with plain arched opening: it is priced 23*l*. A moulded and coped slab, with headstone, is marked 30*l*. The font for Uppingham Church, Rutland, would have been better without foliated ornament in such a material as serpentine: the work of the capitals here is ineffective, and thrown away. Various articles in serpentine are exhibited by Messrs. Pearce of Truro. Devonshire marbles, red and green, are exhibited by Mr. J. C. Stark of Torquay, some of the specimens being in the form of chimney-pieces. The grey fossil marble of Galway, and a marble from the Isle of Man, also are shown. The Connemara green and black marble is exhibited by the Law Life Assurance Society. The illustration of materials of this class, from the United Kingdom is small in proportion to the number and variety of them.

The Derbyshire marbles especially, are poorly represented; though the mosaic tables, and other forms sparkling with colour, into which the marbles are worked, may surprise those who do not know what there is in the county. The black, the red, and other varieties, should have been adopted in the interiors of our London buildings, where scagliola and painted imitations of Italian marbles are used sometimes from pure ignorance that there is a different material, and obtainable in larger blocks than has been supposed. The local marbles contribute much to the effect of Chatsworth House. Not all the marbles exhibited in the Derbyshire manufactures, are found in Derbyshire; but the majority are. The Derbyshire mosaic differs from the "Florentine,"—at least as the latter is practised in this country,—inasmuch as there is not a thin veneer cemented to a backing of stone or slate; but the pieces forming the pattern are let into spaces hollowed out to a sufficient depth in a solid slab. It is evident that great skill is required in the execution of some designs; and want of accurate cutting and setting is apparent in the table-slab designed by Mr. Goldie, which in many respects is very good in workmanship. Manufacturers do themselves as much injury by attempting designs beyond their powers, as by adopting others originally conceived for execution in different material. Another table-slab, which was designed by Mr. Thomas, is more effective than the last. The former is priced forty-five guineas, and the latter sixty-five guineas. They are by Tomlinson, of Bakewell. From Messrs. John Lomas & Sons' marble works, of the same town, are sent specimens of marbles which help to show the variety procurable; though there are many others in the Peak, and about Matlock and Ashford, and on the borders of Staffordshire. The specimens exhibited are called the black, light bird's-eye, dark bird's-eye, coralline, Hopton shell, light fossil, pink fossil, dark fossil, rosewood, and Newburgh marbles. Mr. Samuel Birley, of Ashford, exhibits a table with the top and pillar inlaid, designed by Mr. J. Randall, of the South Kensington School. The ornament, which is very elaborate, is composed of leaves, flowers, and fruit, with birds and butterflies. The colours and conventionalized forms, unless as to the birds, are successfully dealt with: the price—300 guineas—is a high one. There is still wanted, tasteful low-priced art-manufacture; and in that direction, not often taken by contributors to the present Exhibition, we should be glad to see the Department of Art now moving. Black marble vases with inlaying in coloured marbles are exhibited by Messrs. S. Bright & Co., and articles of a similar description by the proprietor of Turner's Museum, Buxton. Small articles in fluor spar from the Blue-John Mine are exhibited by Mr. J. Tym, of Castleton. A word of praise should be given to the objects exhibited by Mr. Henson of the Strand; though his obelisks, not having the hieroglyphics as intaglios, are not accurate representations. We should have mentioned above, the table slab inlaid with Devonshire madrepores, sent by Mr. A. Batson, of Ramsbury, Wilts; and the stalagmite of Mr. L. A. Monteiro; though the latter has the appearance of Spanish rather than British origin. In the northern open court will be found a column with shaft of the Jura marble, the material which is now so much used in Paris, as for the balustrades of squares and bridges, and the basins of fountains.

Slate is shown as plain slabs, and in the forms for roofing, as well as decorated, that is "enamelled." Mr. Hunt states the present consumption of slate in London, as 60,000 tons per annum. Neither the Bangor, nor the Llanberis slates, appear in the Exhibition; and the great variety of forms into which the material is wrought are scarcely hinted at. Every one who has been on the Continent would see that a considerable trade might be carried on in supplying billiard-tables. Those used in France are of small size; and the best machinery for producing them is to be found in Wales. But a foreigner might pass through the Exhibition without having suggested to him that such an article as he was in want of could be supplied. The case adduced strengthens our argument that the Exhibition should not be considered perfect, or even representative of materials, and manufactures; and that the objects, national and international, such as have been lately referred to Mr. Rouher, at the banquet given in his honour, as those of treaties of commerce, should be served by the production of reports, or tabulated information, embracing the whole industry of the country. We lately instanced what is a good model this year, issuing from one foreign commission, as well as two results of 1851; the reports obtained by the Foreign Office are good as starting-points for reports on industries abroad; but we want to get at, and to have the means of supplying, more information respecting our own resources. Architects are constantly wanting it. Even those exhibitors in the South Kensington building who give lists, as we have said, omit necessary information. The producers of iron, exhibiting specimens "broken cold to show fibre," scarcely say what they wish to prove.

The Llangollen Slab and Slate Company are principal contributors to the division of the Materials Department which we were speaking of. They show several slabs of considerable size or good quality. One slab measures 16 feet by 5 feet 10 inches; and another is 20 feet by 10 feet, and 3½ inches thick, weighing 4 tons 10 cwt.; but it appears to have been broken. The Welsh Slate Company of Port-Madoc, exhibit from their quarries at Festiniog, a slab measuring upwards of 13 feet by nearly 8 feet, and 2½ inches thick. One of their slabs, about this size, is rubbed and has the edges moulded. To show the properties of the same slate, they exhibit strips of 5 feet in length and 6 inches in width, which are but one-twentieth of an inch thick. Several other exhibitors from Port-Madoc offer similar specimens. The Rhiwbryfdir Slate Company show that a block (18 inches by 10 inches) which is an inch and a half thick, may be split and dressed into 39 slates; and that out of a block (20 inches by 10 inches) half an inch thick, eight slates can be sawn, the waste in such case being hardly perceptible. There is however great loss in getting and dressing slates, which must render necessary some labour in removing the waste. The utilization of waste substances, just now the subject of popular books, will we hope one day comprise the getting rid of the *débris* of many kinds of mines. A model of a slate-dressing machine, consisting of knife-edges, placed obliquely on a revolving drum, so as to work like the down-cut of a carpenter's saw, is exhibited by one of the Port-Madoc contributors, Mr. J. W. Greaves; and the company there, above named, seem to have a machine that will dress 12,000 to 15,000 slates *per diem*, accurately and completely. The slate ridges and hips of Messrs. R. Williams & Co. also are shown. The roll, rebated as ordinarily, may be used without the slab flashing-pieces, in inferior buildings. The roll may be had with groove to receive the "Rhosydd Ridges," which consist of various modifications of trefoil or Tudor-flower ornament, cut out of thin slab. They are in many respects better as ornaments for ridges of slated roofs, than the clay-ware forms which occasionally are used. There are some specimens of green slate in the Annex, exhibited by the Bwlch-y-Groes Company: but altogether, the varieties of the material in the Exhibition are few. The Duke of Devonshire is said to exhibit slate from Burlington Quarries, Lancashire; but we have not seen it, or that which there is from Westmoreland. There are some specimens of "stone-slate," which is stone, and therefore porous, split thin. The Llangollen Company above named, exhibit various chimney-pieces and other articles in enamelled slate. Among them is a chiffonière, black inlaid with malachite and serpentine, all very well imitated, and priced 40*l*. A chimney-piece representing porphyry with inlaid ornament in black may be had for 2*l*. 13s. If exhibitors generally had affixed prices, the value of the Exhibition to architects would have been greater.

To do justice to the Department of Metallurgic Products would require more labour than we can now give. The exhibitors of iron ores, iron in the rough state and cast, and wrought iron in various forms for use, or to show the fibre and strength, are very numerous. There is probably no department of the Exhibition that evinces greater progress, than this, of late years. It is scarcely fifteen years since many architects and engineers, alarmed by terrible accidents, were all but coming to the disuse of iron for large spans, seeing that cast iron was not to be trusted, rolled iron was hardly to be obtained, and riveted girders had not been thought of. We now find that manufacturers can supply an immense number of patterns; and the cases of some exhibitors, showing every variety of section in different dimensions, would be exceedingly useful could they be deposited in some locality for future reference. Mr. R. Smith's display of iron produced at the Round Oak Iron Works, in the South Staffordshire district, from ores in the Earl of Dudley's estate, amounts to upwards of one hundred and twenty articles, besides the specimens of the coal and limestone. Iron is a more commonly-found material than many visitors to the Exhibition would suppose: the presence of the coal and limestone with it in a district, makes the value of the ore for smelting. Somewhat more than twenty years ago, we believe, the hot-blast was introduced, which did not immediately effect the improvement that was anticipated in the quality of iron; since it enabled the manufacturer to use up inferior materials. From all causes, the varieties of quality, and consequent variations in strength, are very great; and it is much to be desired that the proper composition of good iron should be understood by architects as well as it is supposed to be by others employing the material. In ten girders of the same scantlings, we have known the breaking-weights vary as much as the money-items in a list of tenders. So that, averages may be of little value; and in calculating scantlings, the "constant" should be changed according as the material may be different. The experiments of Hodgkinson & Fairbairn, even those to ascertain the form for girders, would supply many of the figures; as they were made on irons of numerous kinds,—the results being carefully tabulated. Were there any lingering prejudice against the material, iron, on the score

of brittleness, the present Exhibition would go far to remove such feeling; it is therefore only necessary that the merits of particular manufacturers should be known. Nearly all, however, exhibit bars and rods doubled, or tied in knots, or fractured to show a fibre like that of wood, in ways quite opposed to the common ideas of the properties of iron. Amongst the specimens from the Earl of Dudley's Works is a bar of iron 1½ inch square, which, tried at Chatham Dockyard, stood a tensile strain of 64¼ tons without fracture, and broke two of the large cables of the testing-machine.

The articles, about fifty in number, in the transept, from the Low Moor Iron Works, sent by Messrs. Hird, Dawson, & Hardy, also form an interesting collection. They include the Low Moor coal, hard and soft, and coke made therefrom, and used in blast or smelting furnaces and refineries; the Black Bed coal used for engine-boilers and house fires, and the coke for lime kilns and other common purposes; the Black Bed stone lying immediately above the coal last mentioned, in six distinct strata, and containing about 28 per cent. of iron; the white ironstone; the calcined iron ore, prepared by roasting or burning in kilns, or in heaps on the ground, for the smelting furnaces, and the limestone from Skipton, used with the latter as a flux; furnace dross, or the earthy part of the ironstone combined with the limestone, used for roads; pig iron, of which the best quality is used for machine castings, the second for heavy machinery, and the third for forge purposes; refined iron, which is prepared from pig iron by being exposed to a strong blast in the refinery; the cinder or impure matter separated from the metal in the refinery; puddled iron, of two kinds—one adapted for boiler-plate, and the other for railway-wheel tires, the specimens showing fracture; chain iron, several specimens, bent cold in various ways to show toughness and strength, or fibre; boiler-plate, bent cold, with shorn edges; similar plate, doubled when hot so as to show pliability in working, and other specimens punched; knots tied cold; various specimens of bars, punched, doubled when cold, or broken to show grain of the iron; and other articles. Of Messrs. Moore & Manby's specimens, including joists to which wooden and other floors can be readily fixed, we have already spoken. Also very important, as in illustration of preceding remarks, are the sections of rolled iron of Messrs. Moser & Sons of Southwark, and the patterns of Messrs. Sutton & Ash of Birmingham. Be it for girder, purlin, or casement-bar, every form seems to be now procurable. The Farnley Iron Company exhibit bars, rods, plates, and forged axles and piston-rods, and supply lists of prices. The works lie between Bradford and Leeds, and the mineral is the same as that of the Low Moor Works which are south of Bradford. South of Bradford also, and near to it, are the Bowling Iron Company's Works, which also supply specimens to the Exhibition; as do the Monk-bridge Company from the same district, and the Kirkstall Forge Company. The Blaenavon Iron and Coal Company send iron in various forms from Monmouthshire; and Messrs. T. Butlin & Co. from the East-end Works, at Wellingborough; where, if we recollect rightly, the ore has only lately been made workable. The Shelton Bar Iron Company, of Stoke, in Staffordshire, exhibit a plate of the superficial area of 112 square feet; whilst from the Mersey Steel and Iron Works there is an armour-plate, measuring 21 feet 3 inches by 6 feet 3 inches, and 5½ inches thick, which the exhibitors say would have been 15 to 20 feet longer could space have been obtained.

The Mersey Company also show a remarkable piece of work in the form of a double-crank shaft for the *Northumberland* or *Minotaur*, weighing between twenty-four and twenty-five tons. It was wrought into shape by the steam-hammer. It is well to know, thus, what can be done. From the Dowlais Iron Works, Merthyr Tydvil, there is a rolled-iron girder, scantling 9¾ inches by 4¾ inches (the section we have not noted), which is 53 feet 6 inches long. But this is surpassed by the Butterley Company, as in a rail (5¼ inches deep) which is 117 feet long. Near it is a tension bar, for a girder; it is 83 feet long, with the scantling 12 inches by 1 inch. The Company however seem to us not quite fair, as to one of their specimens, a portion of a girder 3 feet in depth, which they mark as "solid rolled." It must have been formed of two T bars and a flat bar for the web; for two lines, showing the welding, are discoverable. Such as they are, these girders could be made 30 to 60 feet in length. Would not riveted plate-iron be preferable? The same Company exhibit good specimens of armour-plates 4½ inches thick; and a main-deck beam, and other portions of an iron steam-vessel, all apparently worthy of the Company's long and good reputation. These specimens, and some others we have named, should be looked for in the courts of the Annex, where may be found a wheel-tire of the Monk Bridge Company, 12 feet external diameter, the weight being 200 lb. How far any of these specimens are properly to be classed as of a new material, such as the Bessemer steel, we have not stopped to notice. If we understand the question at all, the distinctive character of the Bessemer material would require it to be placed in the Eastern Annex. In connexion with the subject of the composition, manufacture, and quality of iron, Dr. D. S. Price's cabinet of illustrations of the smelting of iron in Great Britain would be found useful to those who have entered on the study. The other metals, as lead, tin, and copper, we have hardly space to notice; though the specimens are not numerous. Some models of mines are interesting. Of the most useful part of the Exhibition as regards the metal zinc, we spoke in a former number. A sheet of cut lead, one mile in length, is exhibited by Windhurst's Patent Metal Foil Company. Wetterstedt's metal for roofing and other purposes is exhibited by Messrs. W. W. & R. Johnson & Sons. This material, which has been many years before the public, ought to have evidence respecting its durability, obtainable. Messrs. Morewood & Rogers, of whose material we spoke of in Class 10, are exhibitors both in the court of the Annex, and in the Iron and General Hardware Class. We have not spoken of the moulding sand from Mansfield, the sands of the Isle of Wight, the plumbago and other crucibles; the produce of the chalk pits at Grays, including water suggested for the supply of London; the Paris whiting from the works of the Queensgate Company, near Beverley; nor of many minerals which are more important in industry than conspicuous in the Annex. Neither can we describe the specimens of coal, sections of seams, and models of mines, and models and specimens of safety-cages, fuses, and lamps; though many of these may be studied with advantage by an architect. Mr. C. H. Waring, of Neath, exhibits a safety-lamp which cannot be opened without extinguishing the light. In one of the specimens of coal, is seen alive, and otherwise much as it was found, one of those forms of animal life which are met with in coal. A model of docks and harbour-entrance, exhibited by the Sunderland Local Committee, and a model of Seaham harbour and town exhibited by the Marchioness of Londonderry, deserve to be studied. But this may be the proper place to mention Wolston's Torbay Iron-Paints for coating materials which are to be under water, or in a position to be affected by damp. They are manufactured at Brixham, Devonshire; and, if we may accept the statements of the experience in the dockyards and public works, they meet a great want. A caisson in Woolwich Dockyard, painted nine years since, is said to be in a perfectly sound condition, both under water and between wind and water. It is also said that the Torbay paints have been found to stop corrosion that has set in; so that in Pembroke Dockyard, where in 1859, two iron-roofs had been found so corroded as in the opinion of the authorities to need entire renewal, but where two coats of the paint were applied, the result has been such that the expense of renewal is no longer necessary. The experience in the case of corrugated iron-roofing at the Aberdare Iron Works is even more satisfactory. Two coats were there applied in 1853, and one coat since. Three coats are considered equal to four of lead paint: indeed, the cost of painting six iron girders 13 feet 6 inches long and 36 inches girth, is given as 3s. 2d. against 5s. 3d., which would have been the cost with red lead. The black is said to retain its lustre better than other black paints, especially exposed to sea-water; to resist intense heat, and sulphuretted hydrogen,—as well as acids to some extent,—and to stand "on materials previously coated with coal-tar, where all other paints fail." The specimens exhibited are taken from roofs in the dockyards and arsenals: the greater number of them bear out the statements above; in one or two others, we found paint detached in places, possibly because the specimens had been knocked about.

NEW ENGLISH CHURCH IN PARIS.—A new English church is being built in that part of the Rue Roquépine which is prolonged to the Boulevard Malesherbes.

MISMANAGEMENT OF PUBLIC WORKS IN INDIA.

IN calling attention, as I did in my last,* to the present state of the irrigation and navigation works of India, I am far from wishing to condemn harshly the works of the Indian military officers, who, without knowledge or experience, and often without any adequate assistance, do the best they can; and many of whom would doubtless do much better if properly instructed; but the public good demands that, however disagreeable the duty, the truth should nevertheless be told; and, in discharge of this duty, I fearlessly maintain that the whole of their engineering works—canals, roads, bridges, buildings of all kinds—are disgraceful to a highly-civilized people like the English; that the far greater majority of the officers themselves learn what little they do know from native subordinates or common soldiers, instead of from British engineers; and that their irrigation works, in their present state, are a convincing proof of the truth of this statement.

I have never yet met with one of the so-called military engineers who knew properly how to lay a foundation upon difficult ground, or to truss a roof of large span; I never knew one who properly understood how to make an excavation, or to throw up and dress an embankment; I never knew one who was able to make a proper survey and section for a line of road, or prepare a correct set of working drawings for a work, and write out a good, well-worded specification. As to setting out a railway curve, building a skew arch, designing a good timber viaduct, or erecting a steam-engine, such things are rarely even thought of. If they build a wall, or turn an arch, it is almost certain to crack, and often to fall to pieces: if they finish a roof, it lets in the rain like a sieve: nothing they do is properly begun, and nothing is ever finished. I never yet remember seeing a well-made and well-burnt clamp of bricks, or scarcely ever a piece of good masonry. Plastering alone, which the natives do exceedingly well, covers all other defects, until crack upon crack reveals what the plaster is intended to hide; and, so far from there being any signs of improvement in this state of things, it gets every year worse; and the works done in India during the past three or four years are far inferior, both in design and execution, to those done forty years ago; indeed, I very much question if the latter works will be in existence at all forty years hence.

And yet the Public Works Department in the Madras Presidency alone is an enormous establishment. It numbers nearly 1,300 persons of all grades, from the chief engineer down to the lowest native subordinate, exclusive of the workmen employed. Their united salaries amount to something like 70,000*l.* per annum; and the money they expend about ten times that sum, or 700,000*l.* per annum. What the nation gets for this money it is very difficult to say—when in many cases whole provinces are almost destitute of roads, and in some places wheeled vehicles are hardly known.

It is now about eleven years ago (January 30th, 1850) that a commission was appointed by the Home Government to inquire into, and report upon, the state of the Public Works Department of the Madras Presidency. The commission consisted of Major Balfour, Mr. Bourdillion, and Major Frederick Cotton. Their report took twenty-two months to prepare, and occupied nearly 300 pages of closely-printed matter; with an Appendix, consisting of about 100 pages, containing much valuable statistical information. What was the result of their labours may be gathered from the following two or three extracts.

In p. 208, par. 500 of the Report,† after alluding to the wretched state of the department, as far as practical art is concerned, the commissioners say:—

"There is not at this moment in the whole Madras Presidency a really good and well-shaped brick to be purchased: not one ingredient of any material used is well prepared; and the same description of tools are in use throughout the country with which the temples were built one thousand years ago. Even those labourers who work by contract have not the energy to put their strength to what they are engaged in; whilst those who are employed on daily wages work as though they considered it a duty to themselves to do no more than they can help. The money lost by apathy and want of skill, by bad materials wrought with ill-formed tools, and by waste from wanton carelessness, even in the works best managed in the present day, is a far heavier per centage upon the outlay than has ever been paid for superintendence; and must be so till we have introduced better apparatus for the manufacture of materials, taught the use of modern tools, and, by a general employment of Europeans, shown what energy can do when well applied," &c.

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* See page 509, *ante*.

† "Report of the Madras Public Works Commissioners, ordered, by the House of Commons, to be printed, May 27, 1853. Price 4s. 6d."

And in allusion to the difficulties with which the officers are beset, the report states, in page 217, par. 524,—

"It may be gathered from the foregoing remarks that the camps of the civil engineers are constantly in motion, and ever moving with the greatest speed attainable. Every officer in the department feels that he is always wanted where he cannot go, in spite of all his efforts: the more he sees and does, the more anxiety and cause for haste he brings upon himself; and, while in this state of restlessness, if he is to advance the country he travels over, he must find time for projects of improvement, and snatch it as he can from days already crowded with other urgent duties. His information must be taken hurriedly: his observations of the ground must occupy as few days or hours as possible; and, in drawing up his estimate, he must do it with his camp still moving on, out of reach of books of reference, and working with people weary of the constant travelling; and, with good reason, discontented. Added to this, as has been before mentioned, he has the roads, ghauts, and all public buildings more or less under his control. Move where he will, he finds more work wanted than he and his subordinates can effect; and he has no season of recess or rest."

Again, in referring to the imperfect education of the military engineers, in page 207, par. 497, the report says,—

"The very limited scale of our professional establishments compels the employment of young and inexperienced officers in the projection of works, who, as a necessary consequence, fail to see how the object aimed at may be most cheaply and most effectively attained: in short, our engineers are unavoidably put to actual work while they ought to be only under instruction; and they gradually acquire skill and experience by a succession of errors, of which the state bears the cost."

In 1854, Colonel Arthur Cotton published a work, entitled "Public Works in India: their Importance," &c.*—a book which certainly reflected far more credit upon his character than did the construction of the Godavery Anicut. In this work not only did Colonel Cotton endorse everything that the above-mentioned Report advanced,† but added the weight of his influential position to give effect to the statements and recommendations contained therein; and, in 1857, the same gentleman, in a small pamphlet, entitled "Profits of British Capital on Indian Public Works,"‡ says, in page 50, "Why should not twenty European civil engineers, of different classes, be sent to every one of the 120 districts in India; making a total of 2,400 engineers and overseers, &c.?"—thus clearly indicating his conviction of the superiority of the English system as compared with that of India. And, in another place, the same gentleman states "that we ought to teach the natives of India how things are done in England, instead of learning from them how things are done in India."§

The expression of similar views from numerous other authorities induced the Government to attempt the introduction of a new system; and, in 1855, the entire department was re-organized under the direction of Colonel Faber, while the Home Government sent out from England a small number of English civil engineers,—about 15 or 20, I believe,—to introduce a new element into the system.

It might perhaps be supposed that now, at least, something would be done towards the improvement of a department of the public service that had been shown upon all hands to be so thoroughly defective. Nothing of the kind whatever was contemplated by the Local Government. Every abuse and every defect that existed under the old system was carefully preserved or increased. Appointments were bestowed upon military officers as a reward for services in the field against the rebels,‖ without the smallest regard to scientific fitness; and, on the other hand, officers who possessed personal or family influence, and who, for twenty years or more—sometimes during their entire life—had never done one day's military duty, were allowed to draw full military as well as full civil pay, and engross to themselves every really valuable appointment in the department. The engineers sent out from England were put under the direction of these half-military, half-civil ignoramuses, and ordered to implicitly obey their instructions upon pain of immediate dismissal. Conditions were imposed upon them never hinted at when they left England; and all appeal to the Home Government was practically denied to them, as no communication was allowed to pass between them and the parties by whom they were appointed in England, unless it went through the channel of the Local Government. Under such circumstances, they had nothing to do but to submit; and Col. Arthur Cotton, who had so eloquently exposed to public shame the defects of the old system, became now one of its chiefest supporters. The English engineers, he said, did not understand Indian works: such works ought to be entrusted only to old Indian officers—the very class of persons whom he had previously declared to be the greatest bane to the country.*

Let us now see the results of this course of action. The *Madras Examiner*, June 9th, 1859, states, that since 1855 (that is since the professed new organization of the Public Works Department), 197 bridges, three anicuts, and twenty-seven supply channels have been swept away, costing about 510,000*l*. How far this statement may be exact I have no means of ascertaining; but, as it has never been contradicted, it may fairly be presumed to be not very incorrect: certainly, without any prejudice, my own personal observations would lead me to believe in its accuracy. In all parts of the country may be seen bridges—broken, cracked, or tumbling down; roads unfinished, almost impassable, and often leading nowhere; channels half excavated and filled with silt; locks only partly built, or altered because they have been built wrong; and everything else in much the same condition;—most of the engineer officers—military men destitute of all practical knowledge, mere amateurs, in fact—dependent entirely upon native foremen for instruction; and the European overseers—common soldiers, corporals, or sergeants—many of them so ignorant as hardly to be able to write.

A stranger, upon perusing the rules laid down for the guidance of officers in the Department of Public Works, would be apt to imagine that nothing could possibly be better organized, or better regulated; but let him but make himself acquainted with the practical working of the entire body, and he will speedily discover such a heap of anomalies as would convince him that in no establishment in Great Britain would such absurdities be tolerated.

In one of the despatches from the Home Government, No. 14, date August 22nd, 1849, it is stated, that with reference to a certain bridge, it had given way three times, entirely through errors in the construction; and two other bridges; one also stated to have failed from the same cause; and on the 22nd of January, 1857, more than seven years after, we find the chief engineer issuing instructions to the various district engineers respecting the bridges, &c.; which instructions, he states, are called for in consequence of the frequent accidents that have occurred of late to the bridges and other works under construction.

On the 26th of November, 1859, a district engineer reports that, on Trunk Road No. 6, the embankments are breached in many places; that five arches of a bridge at Sooloonpette had fallen in; that a two-arched bridge was reported to be entirely destroyed; that the wing-walls of two other bridges had been washed away; and that many tunnels (culverts) had been totally or partially destroyed. This road is in the same state now, although more than two years have elapsed; and it is one of the main roads from Madras northwards.

During the latter end of the year 1860, I saw four bridges completely broken down; two more partially destroyed; and two more dangerously cracked; besides several drains across roads which had partially or wholly fallen in. Two of these bridges were of considerable size: one of them had on the parapet the names of Col. Pearse and another officer, formerly high in the department. In 1861, I met with sixteen broken bridges; nine of these upon one line of road.

Indeed, if every officer in the Public Works Department were to give a true and faithful account of all the failures which he had witnessed during his engineering career, what a list would be exhibited! Sir C. Wood lately expressed his gratification at some photographs of railway works in India: let him engage a few good photographers to take views of the roads, bridges, channels, barracks, &c., after each monsoon, and before repairs had been commenced, and he would very soon be able to understand why "*maramut works*"—as the repairs are called—absorb annually so large an amount of the entire expenditure

Neither is there, in fact, any real occasion for all this: the climate of India is by means more destructive to buildings than is that of England. Granted that England has not the intense heat and deluging rain—India is equally free from the destructive effects of frost and dry-rot. During the working season—generally from October or November to April or May—they are quite certain of settled weather; and the storms during the breaking up of the monsoon, although apparently more formidable than those in our northern climates, are not really so; indeed, I question if any storms in India are more truly violent than many in England.

To what, then, is to be attributed the bad condition of our Indian public buildings? I answer, to the utter want of practical knowledge on the part of the designers and engineers; certainly not to their neglect or inattention to their work. Heaven knows! many of the officers work hard enough; and often are they compelled to retire with shattered constitutions and ruined health; but the defective state of their professional education is everywhere apparent. When a foundation is to be laid, a trench is dug two or three feet deep, into which is thrown, generally by native girls and boys, heaps of stones of all sizes and shapes, without any order or regularity; the interstices filled up with mud, which, by the sun's heat, is speedily baked hard as a rock; to be converted into pudding the next rainy season upon this foundation, which never has any footing course, and no kind of bond. The walls of the superstructure are raised, likewise of rubble-stone, in mud, the stones being of all sizes and shapes,—no attempts at courses, no laying the stone on its natural bed, no bond of any kind; the angles of the building and the quoins of the doors and windows of brick, in chunam; but the bricks, soft, badly shaped, and badly burnt, are more like a clumsy clod of half-baked clay than anything else. The walls, for buildings only one floor high, are frequently made 2 feet thick, or more, and the joints often 1 or 2 inches; the whole covered, externally and internally, with a thick coating of chunam (as lime and mortar are termed in India). The inside speedily becomes a nest of white ants, who excavate large hollows between the stones by carrying away the dry mud, and the walls crack and settle in all directions, and frequently fall to pieces. The roofs are equally defective. Terraces (flat roofs) are great favourites in India for the superior class of buildings, although they seldom have any means of ascent, except by a rickety and dangerous ladder. These terrace-roofs are formed of bricks and tiles, set in chunam, and plastered. The mass, frequently 1 foot in solid thickness, is so heavy as to cause the timbers upon which it rests to sag, and thereby crack the terracing in all directions. When this happens, all hope of being able to make the roof water-tight is delusive. The cracks are often filled with cotton rags, steeped in tar, or with a composition of resin and sand; but the heavy searching rain gets in, in spite of every precaution; and frequently, when no cracks are visible in the roof, the rain saturates the whole porous mass like a drip-stone; and then, after two or three days' heavy monsoon downpour, all parts of the roof leak equally; the furniture, bedding, &c., get wet and spoiled; mildew forms on the timbers, by which means they decay speedily at their bearing-points; and it takes months after the rains are over to get things again to a proper state.

When tiled roofs are resorted to, the effect is certainly both cheaper and better; but here, again, the same want of practical knowledge is manifested. No proper slope is usually preserved. The tiles—generally of the kind termed "pot-tiles"—are small, thin, and are very badly burnt. They are merely laid on, with no proper gauge or lap, and easily displaced. Notwithstanding all these defects, a well-tiled roof is far cheaper, and far better, than any other kind known in India.

The want of professional and practical ability is the only valid excuse for this state of things. British India contains every necessary material for buildings of every description:—clay for bricks and tiles; fire-clay for fire goods; limestone, kunker (nodulous limestone), and shells and rock-coral make excellent limes; fine and coarse sand, for mortar, &c.; granite, syenite, hornblende, coarse grit stone, laterite (tufa), narpery (a beautiful white and fine slaty marble), teak wood of all sizes, and timber of a great variety of kinds, mostly hard wood; while, for temporary purposes, bamboos of enormous size, palmyra trees (called vasums), cokernut and palmyra leaves, and grass and cholum straw, for thatching; narr, coir, and cokernut hemp for tying;—these, and numerous other articles of the most useful kind, can be obtained, in greater or less quantity, all over India, and many of them extremely cheap.

The magnificent remains of ancient architecture and sculpture, both Hindoo and Mussulman, that exist in India, attest the skill of the forme inhabitants; and which could undoubtedly, with suitable care, be revived in the present races. In

* Richardson, Brothers, Cornhill. 1854.
† See Preface, p. 7.
‡ Richardson, Brothers, Cornhill.
§ "Public Works in India." page 52.
‖ After the rebellion, of course; but a similar system was pursued long before.

* "Public Works in India," page 55.

these remains may often be found vast masses of masonry, of the most perfect construction, formed of enormous blocks of granite and syenite, beautifully and accurately cut; and many of the sculptures finished with a delicacy that might rival the artistic excellence of ancient Greece or the simple massiveness of Egypt.

I must leave for another communication what I have further to say. INDIAN.

A WALK AND TALK IN ROME.*

THE story of certain monuments—and we might especially cite the Colosseum, the Arch of Constantine, the Temple of Pallas, the Pantheon, &c.—may be said to exemplify the general destinies of Classic antiquity under Papal government in Rome, with all the transitions and contrasts of strange vicissitude, in the successive phases passed through from deliberate devastation to carefully-ordered if not tasteful repair. A proud but turbulent vision of the Middle Ages rises before the mind's eye in contemplating that Amphitheatre first styled (from its vast dimensions) "Colosseum," in the citation from a popular saying by the Venerable Bede, who beheld this edifice in the eighth century, still complete in all its majesty of parts and proportions. But who does not know the story of the Vandal spoliations suffered by it before being finally protected by its investment with sacred character under Benedict XIV.? From the description by Ammianus (l. xvi.), it appears to have stood intact and *grandiose* as from the first in the year 357; and the chase of wild animals, even the bloody shows of gladiators, still continued within its walls; the former till the sixth century; the latter (strange to say), notwithstanding all opposition from the spirit and laws of Christianity, till A.D. 403, when they were for ever suppressed by Honorius, in consequence of the noble self-sacrifice by an Oriental monk, Telemachus, who rushed into the arena during one of these homicidal spectacles; kneeling there, entreated the spectators to have mercy on their hired victims, to renounce those cruel entertainments, and himself fell a martyr, overwhelmed by showers of stones, on the spot where a Divine religion had yet failed to triumph over inhuman selfishness. In 442, and again in 508, this edifice was shattered by terrific earthquakes; but in each instance repaired—first by the prefect Lampadius, next by the consul Venantius. More than one-half the circuit of its outer walls and arcades perished totally in the conflagration caused by the troops of Guiscard, 1085; from which date its ruins must have borne nearly their present aspect, with little perceptible change, at least at an outer view, though great and repeated losses of material. In 1130 they became the chief fortress of the Frangipani family; till, in the following century, under Gregory IX., the Annibaldi (or Annibaldeschi) obtained the permission of the Emperor Frederick to divide the whole building, as a feudal stronghold, with that rival house! But in 1312, the Emperor Henry VII., then on a visit to Rome, obliged the latter to surrender this, with other fortresses and palaces they had obtained possession of;† after which it appears that no other family ever held, or defended themselves in, the Colosseum; and the much-abused ruins remained under the official care of the Senate. During this century it was the favourite scene of bull-fights, called *giostre*, in which youths of noble degree displayed their prowess; but no spectacle of which description took place after that attended with great pomp of heraldic devices, decoration, and aristocratic attendance, but of tragic results, in the 1332, described by a contemporary chronicler, Monaldeschi, as preserved to us in the pages of Muratori. Through the untamable fury of the beasts, too strong for their assailants, eighteen gallant youths were stretched dead, and nine left seriously wounded on the arena, causing the festival to end in a funeral, magnificent mortuary rites being celebrated for these victims at S. Maria Maggiore and the Lateran. In 1349, the earthquake described by Petrarch probably inflicted great injuries on this as on other Roman monuments, inferrible from the letter of the Legate in this city to Urban V., at Avignon, complaining that he had found no purchasers except the Frangipani for the stones of the Colosseum, by him put up for sale, no doubt, in the result of some great overthrow. But one portion, at least, was saved from wilful devastation by its cession, in 1381, through act of the Senate, to the chapter of the Lateran, for the purposes of a hospital in dependence upon that, still one of the most important, dedicated to St. John, near the same basilica. Poggio, writing about the year 1425, describes the Amphitheatre's then condition with something of the exaggeration elsewhere observable in his lamentings over Roman antiquity:—though, indeed, the outrages then recent might claim indignant remonstrance; for not many years had passed since, in the previous century, the baronial families had entered into a regular compact to make the Colosseum their common quarry for all purposes of building! In 1471 was built, out of the spoils hence extracted, the castellated Palace of St. Mark (now "Di Venezia"), by Paul II., for his own residence; in 1480, that of the Chancery, by Cardinal Riario; and, early in the next century, the Farnese Palace, by the cardinal of that family, who finished it after becoming Pope Paul III.

Till 1550 continued the practice of using these ruins as a quarry for various buildings and embellishments of modern houses, even without the pretensions of patrician grandeur; but it does not appear that there was any wilful demolition for supplying those more conspicuous palaces; rather that the material taken away had already fallen from the erect portions, as was the case when, in 1703, an arcade of the second story having fallen, its travertine blocks were used for constructing the port on the Tiber opening off the Via Ripetta (v. Moroni, *Dizionario di Erudizione*, v. xv.) Maranzoni (*Memorie sacre e profane dell'Aufileatro Flavio*) notices no fewer than seven different theories to account for what at once strikes every gazer. The innumerable cavities that completely riddle the whole front to its highest elevation, evidently a work of time and toil, are therefore to be referred to any of the violent storms brought on Rome by invading armies. As many of these gaps appear, it is impossible to suppose them caused by the removal of metallic cramps; the woodwork thrown up for purpose of defence by the Mediæval fortifiers, here installed, may be conjectured among other causes.

A quasi-sacred appropriation had long previously been determined for a spot within this great area, since the Confraternity of the Gonfalone, instituted in 1263, had begun to perform annually on Good Friday, within an arcade of the outer cincture, the mystery drama on the Passion and Resurrection, which strange presentment of the awful subject actually continued in this capital of the church till the year 1540, being then abolished, under Paul III., in consequence (it is believed) *not* of any moral objections, but some obstacle from the progress of decay! Andrea Fulvio, who lived to see this performance, says "the numbers who assemble to behold the spectacle are not less great than were those in ancient time collected to witness here the pomps while Rome was triumphant and reigning over the world." (*Antiquitates Urbis*) Sixtus V. projected, but did not live to accomplish, the reducing of the whole edifice into a woollen factory, and an asylum for paupers, to be kept at work in that branch of revived industry; and Clement XI. had the corridors appropriated for the production of saltpetre, after the outer arcades had been walled up: a precaution suggested by the frequency of crime, whose perpetrators found in those dark recesses a shelter and places of rendezvous with terrifying dangers to the neighbourhood. That same pontiff was first to adopt the idea of a *consecration*, and consequently had erected a chapel within one of these lofty arcades, where a hermit was placed as guardian, to reside in this ruin-solitude, 1741. About this period a pious confraternity undertook to make the arena a scene of devotional exercises, by celebrating on stated days the *Via Crucis*, or Stations of the Cross; and to meet their purpose with encouragement, Benedict XIV., in 1749, ordered the erection of the fourteen shrines, with their pictured representatives of the acts in that dread history (wretched works of art indeed), besides the planting in the centre of that simple, but here all-sufficient, monument to Christianity, the plain wooden cross elevated upon steps. Thus was initiated, with inaugural benedictions, the Via Crucis, still celebrated on the evenings of every Friday and Sunday, after a procession from a church on the Forum, in the Colosseum, and still happily left in its primitively austere character, without any theatric adornments, affecting and highly picturesque amidst the accessories of such a scene.

The first works for restoration were undertaken under Pius VII.; and in 1805 arose the immense buttress, on the side towards the Lateran, in firm brick masonry, that shoots up to the highest cornices. In 1811 began the process, continued for three years, of clearing the whole interior from encumbrances, soil, or other materials. Again, in 1828, under Leo XII., much was accomplished for the propping up of decayed portions; and thirteen years previously, repairs of the interior were carried on with important results; for, two years after that undertaking commenced, were discovered the series of subterraneans under the whole arena, with three circuits of walls concentric to the podium, and seven parallel corridors; which gave rise to much discussion among archæologists: Fea and Re disputing whether they had pertained to the original construction, or to the period of decadence; Nibby assuming (and with just reasons) that they belong to the restorations under Trajan. After an elevation of the arena above its former level, though such substruction had not existed at the time naumachia used to be among spectacles given here, as by Titus and Domitian; that this series of hypogees having been injured by one of the earthquakes in the fifth or sixth century, were subsequently restored in the inferior style of that epoch, to which the masonry now brought to light was found correspondent. The similar subterraneans, now uncovered and permeable, at the Amphitheatre of Capua, must be allowed to corroborate this theory, well argued out in the *Roma Antica*. Another interesting discovery, made about the same time, was the underground corridor formed by Commodus, passing in direct line to the Cœlian Hill, to communicate between his residence in the Vitellian Palace and the podium, and in which the unsuccessful attempt was made against the life of that gladiatorial tyrant. Its pavement of white mosaic (or tessellated marble), its walls with a socle of marble below a coating of stucco, once painted, this historic accessory still remains visible, though often partly filled by water; whilst all the other underground compartments are again inaccessible. Those researches, in Nibby's time, brought to light also several marble fragments of beautiful detail, from architecture and statuary, and the more rudely-wrought marble tripods, for burning perfumery, now laid with other *débris* around the arena. The two inscriptions, recording the repairs in the fifth and sixth centuries (barbaric in style and orthography), stand near two principal entrances.

Over the entrance from the Forum (where, day and night, we have now to pass a French sentinel, reminding us of Rome's subjection) is a long epigraph recording works of repair by Clement X., in 1675; by Benedict XIV., in 1750; and by Pius IX., in 1852; and in the Latin lines preceding, "*Diis gentium impio cultu dicatum—ab impuro superstitione expiatum*," is advanced a theory rather startling; for how maintain that the worship of heathen deities, minutely as its practices entered into life's transactions, had ever its dedicated seat in this amphitheatre? The most notable repairs under the present pontiff, completed in his seventh year, are on the side next the Esquiline Hill, at one of the four imperial entrances, distinguished by its decoration, paonazetto columns, and white marble entablature, now preserved but in fragments, and by the absence of the numbers cut in the keystones above all other archways, thirty-three out of eighty, the entire aggregate, being the arcades now erect, with their enumeration in order from xxiii. to liiii. The oratory, raised by Clement XI., still remains in its vaulted niche, though no longer used for mass; during carnival, the Via Crucis every day assembles a devout multitude within this arena; and the most striking profane spectacles, since mystery plays ceased amid these encircling ruins, have been the illuminations by Bengal fires, several times renewed, either for political festivity or private entertainment, under the present pope. At a general survey of these sublime ruins (now clothed in the verdure of spring, and gemmed by thousands of wild flowers, in all the poetry of decay) it must be owned they afford proof of energy on the part of Rome's government, for the repair of those damages long so systematically and barbarously inflicted. We have, indeed, to examine much before becoming aware how vast the extent of restorations, all dating from comparatively recent years. At the south-west, where the Norman conflagration destroyed the whole outer cincture, two orders, complete with seven arches, and part of the arcade to a third order, were rebuilt under Gregory XVI.; on the side towards the Forum, two arches with their pilasters on the first order, one on the second, and part of one on the third, pilasters included, are modern, and dated the third year of Leo XII. (1826); by far the greater portion of the immense arcades belonging to the outer cincture is, at the inner

* See pp. 289, 470, &c., *ante*.

† *Coliseum quorum possessor erat reddere coëgit*, v. Albertino Mussato, "Hist. Aug." lv., in which passage we find the misspelling of the name, often repeated without regard to its derivation, and vulgarized by the Romans into *Culiseo*.

front of its circuit, a restored structure in brick-work imitating the antique.

Of all Rome's triumphal arches, that of Constantine is best preserved; and one modern accessory has added to its solemn grandeur, in affording the umbrageous background of plantations, the public gardens along the lower slope of the Cœlian. Yet, strange the medley of styles, of the glorious and the base, on its surface! The superb columns of *giallo antico*, the larger reliefs, and the eight statues (except one restored) of barbaric captives, in Phrygian marble, being all spoils from that Arch of Trajan, on his Forum, now utterly destroyed. On its attic are inscriptions, telling how the first Christian emperor (to whose religion is no direct allusion here), "pious, happy, august," &c., *instinctu Divinitatis et Mentis magnitudine*, delivered the Republic from a tyrant and his faction. Nor are those words without significance, in their exceptional introduction amidst the lapidary style of ancient Rome; and a renovation apparent in three lines has led to the inference that they were substituted for some other phrase, in sense more Pagan, after Constantine's open profession of Christianity. The double period recorded in the words *Votis X—Votis XX*, that of the decennial and bicennial vows of the Senate for the emperor, allows us to determine the date of this monument at about A.D. 326, shortly before the twentieth year of Constantine's reign, and therefore considerably later than that of his victory over Maxentius—the very year, indeed, when his refusal to participate in the sacrificial rites of worship to Jupiter on the Capitol, in thanksgiving for that anniversary, so displeased the Senate, that he is said to have been in consequence led to the resolve, important for European destinies, of transferring the imperial seat to Byzantium. Above the three archways of this monument is carried a zone of small reliefs, among the few sculptures executed expressly for it, so pitiably contrasted with those of Trajan's Arch, that even the interval of two centuries seems little to account for the hopeless decline they evince: their subjects, the Siege of Verona (or of Susa, first invested and taken in the war against Maxentius); the battle on the Tiber, near Rome; the triumphal entrance into Rome on a car guided by Victory; the allocution made by the victor on the Forum (interesting as a view of that locality, the emperor and his captains standing on the *Rostra* between the Arches of Septimius and Tiberius); and the *congiarium*, or distribution of largess among the populace: last act in the triumphal festivities. The other original sculptures of Constantine's epoch are reliefs of Victory and the Four Seasons, implying the enduring life of the Empire; those of an emperor on horseback passing over prostrate foes, and the same figure crowned by Victory, with the epigraphs—*Liberatori Urbis, Fundatori Quietis*—are referred by some critics to the time of the Gordian emperors, and are also immeasurably superior to the sculptures of later origin. Relief-busts of Constantine and his three sons, within the lateral archways, have almost disappeared; and in those smaller groups the head of the emperor is, in each instance, nearly obliterated. The natural respect for a Christian prince and signal benefactor of the Church perhaps operated, though far less than might be supposed natural in this Catholic centre, towards protecting his memorial from wilful spoliations and abuses. Those inexorable Frangipani fortified themselves here also, turning the arch into a donjon-keep, not content with their possession of the Colosseum, and similar intrenchment at the other Flavian monument. Alike with other epigraphs, these also have lost every trace of the metal once filling them; and the trophies—metallic pivots for which are still seen, and which are alluded to as extant, in the sixteenth century, by Fulvio—have alike vanished. Well known is the story of the decapitation of those eight statues, the barbaric captives, in paonazzetto, bold and finely executed colossi, achieved in mad prank by Lorenzino di Medici, afterwards notorious as the assassin of his cousin, the Duke Alessandro, at Florence; for this outrage, placed under the ban of the Roman government; though his too-indulgent relative, Clement VII., was then on the throne, he was obliged to fly for his life, on which a price had been set by proclamation of the Senate; and a most characteristic proceeding, expressive of learned indignation, was the assemblage of an *accademia*, in modern Roman style, to recite compositions denouncing the odious deed. What became of the other original heads is unknown; but in 1734 they were replaced by new ones suitably executed; a fragment of the only one among these figures, whose antique original is entirely wanting, now stands in the Capitoline Museum. For a period this arch was the assigned property of the Camaldoles monks of S. Gregorio. Under Clement XII. began, 1733, the works for its repair and protection; but till 1829 it was surrounded by unsightly walls, then first removed so as to leave it accessible from every side. One other glimpse of its Mediæval aspects will present it to our retrospect completely swathed and disguised by the gorgeous ornaments with which all Rome's similar monuments used to be decked out for the pageantries of the Papal "possesso," or instalment at the Lateran.

In the Acts of St. Sylvester are described the imperial allocution and assemblage, here distinctly represented in the Roman Forum, with a change of the scene to that of Trajan; and the report that in his address Constantine there openly declared his profession of Christianity, enjoining his subjects to follow the example, to which they responded with enthusiastic acquiescence! Baronius (*anno* 324) adopts this apocryphal account, without regard to the extreme dissonance both of facts and monuments. Threading the obscure streets that cluster to the east of the Forum, we suddenly come upon one of Rome's most beautiful ruins; but to this day abandoned in a condition that excites sorrowful amazement, and seems an insult to the intelligence and the feeling of the age. Europe has a right to reclaim against the disgraceful neglect in which hitherto has been left what remains of that Forum founded by Domitian, completed by Nerva, whose name it bears; also known as the "Forum of Minerva,"—Palladium, Forum Transitorium, from its being traversed by a public street. Of its superb atrium, within which stood the Temple of Pallas, and subsequently one to Nerva, we now see a fragment shut in by paltry houses, and itself applied to the uses of a baker's shop, its two magnificent Corinthian columns (sole remnant of the inclosing portico) more than half buried in the ground, under a wretched street! On the high attic, with cornice and entablature of the richest character, still appears, though much mutilated, a majestic colossal figure of Pallas in relief, with helmed head and peplus; on the frieze below, the same goddess, superintending the several walks of female industry, lateral to which grouping are seen the arcades of an aqueduct, and the source of the Anio, among the rocks near Tivoli; nor have time and injury from man, though their effects be but too apparent, destroyed the interesting character of the subjects, or obscured the merits of delicate execution still to be appreciated in these admirable minute reliefs. Much more of both temple and atrium existed till the seventeenth century, and long enough for Palladio to make a drawing of the less-decayed edifice, while the front of the pronaos—a Corinthian hexastyle—was still erect. Ten columns and sculptured marble walls were swept away to be used for the showy rather than graceful fountain of Paul V. on the Janiculan Hill; but, as Donati describes, the then condition of these lost features was decayed to a degree threatening speedy disappearance:* and, since that last shock, the state of ruin must have rapidly become what we now behold. Strange notions attached to the beautiful relics of the Middle Ages, like others in popnlar acceptance reported by the author of the *Mirabilia;* for in those times the "Arch of Nerva" (no longer a term intelligible, no arch being here) became, by change of a few letters, the "Ark of Noah"; and this astonishing misnomer actually continued in use so long as to be repeated, in the fifteenth century, by Flavio Biondo; in the sixteenth, by Andrea Fulvio! not, indeed, that those *savans* participated in the vulgar error they cannot account for, though an arch, probably triumphal, stood here in ruin till annihilated at a later period.

Till 1612 remained the inscription on the frieze: *Imp. Nerva. Cæs. Aug. Pontif. Max. Trib. Pot. II. Imp. II. Procos*, which Palladio copied. A Greek writer of the seventh century mentions that the statue of Janus Quadrifrons, transported from Falerii, on the taking of that city, to this Forum, still stood within its walls, occupying a small temple to the god with four faces, though *not* that famous one only shut in time of peace. In Palladio's plan of the whole, are fourteen intercolumniations; probably the places filled by the colossal statues of the deified emperors, on bronze basements, here set up by Alexander Severus; and we have pleasure in associating the names of two of Rome's worthiest Cæsars with ruins still so beautiful. The entire edifice remained erect till the eighth century, perhaps unscathed save by the loss of its bronzes and sculptures, in the general and deliberate spoliation of temples and fora by Constans, on that remorseless emperor's too memorable visit. Its state of ruin probably dates from the tenth century; but an arch, restored magnificently by Palladio, as one in honour of Nerva, existed in part till 1450, when Poggio saw and mentioned it in his *De Variet. Fortunæ;* the same, no doubt, alluded to in the Pontifical *Ordo* of 1143, and then called *porticus absidata*. When the demolition was decreed by Paul V., in 1606, there stood ten columns erect, with frontispiece and epigraph, now tastelessly appropriated for the Janiculan Fountain and the Borghese chapel at S. Maria Maggiore; and towards the end of that century was destroyed the remnant of an archway, probably the "Noah's Ark" of Mediæval Rome.

* Donati, however, speaks of only *two* columns erect; perhaps those still before us.

SOME NOTES ON THE EXCESS OF INFANT MORTALITY IN ENGLAND.

NOTWITHSTANDING all our sanitary and other improvements, which throughout the country have saved a considerable percentage of human life, it is to be regretted that, while favourable progress is being made in the reduction of the death-rate of persons from five to seven years and upwards, the destruction of infant life, instead of declining, is actually on the increase. This is an unfortunate and even disgraceful fact in our present social condition, and is a subject which demands most serious consideration.

While observing the sanitary and social states of the industrious and poorer classes in the metropolis and in our larger towns generally, we have noted some of the causes which lead to results so much to be regretted; and it will be our present object also to direct attention to them.

First, are the bad and ill-arranged house accommodation, the want of ventilation, and overcrowding; the dirt and neglect in miserable homes. These causes damage the health and strength of parents; and hence weakly children are brought into the world only to be rapidly driven out of it again. The sanitary aspects of this question, however, have been so well discussed, and the results so clearly put before the public, that it may just now be of more advantage to refer to other of the agencies at work in materially adding to the number of infant deaths. Amongst these are cruel and wilful acts of child-murder, which crime is on the increase, particularly in some of the western districts of the metropolis.

There are, also, yearly, a large number of infant deaths attributable to accidents, such as "overlaying," and smothering in the night by bed-clothes. Often, in the dingy courts and streets inhabited by the poor, we have been surprised and pained by noticing the little attention paid to such events by neighbours. Such deaths are common occurrences too often attributable to carelessness or drunkenness, and, we fear, at times, to wilfulness.

Neglected, grim, and unwholesome as are many of those districts, so densely crowded by the poor; in the outward aspect of such localities there is even a worse feature in the large proportion of decrepid, dwarfed, pale, and haggard children: their diminutive size is remarkable: in those of three or four months old it is smaller than the normal size of infants of one month: in all directions are to be seen great staring glassy eyes; skins of a sickly yellow, or of a bluish-white tint; the hair often white and thin; and there are many enlarged heads, crooked and attenuated legs, and skeleton arms and chests. There is no doubt that part of this evil is caused by the drunken and depraved habits of the parents; and it is a sad fact, which does not admit of dispute, that the vice of drunkenness is increasing to an alarming extent amongst the women who live in such districts as the Brill (Somers Town), Golden-lane, and in the east of London. It is no unusual thing to see the wives of working men with children in their arms wandering from their homes to the pawnbroker's, and from the pawnbroker's to the public-house: their besotted appearance shows that the breast milk must be poison; but the ill effect is greatly increased by the abominable practice which prevails in London (and not in this class alone) of giving gin and porter to infants of three or four months old. This is frequently done with the utterly mistaken idea that such stimulants give permanent strength, and are essential to health.

A bad and insufficient supply of food also does deadly work. Naturally weakly in constitution, and affected by the pestilential atmosphere which surrounds them, the quality and quantity of

their food still further render these unfortunate children ready victims to the worst degrees of scrofula, typhoid fever, cholera, or other epidemics which may be prevalent.

In many cases, mothers who are forced to work have to leave their young children in care of others not much older than themselves, and who are quite unfit for such a charge: to keep them quiet, opiates are administered, which, in order to continue to have effect, are increased in power. In the manufacturing towns in which female labour is in demand, this objectionable plan alone produces a large amount of idiotcy, disease, and death.

But it is not amongst the poorer people alone that the excessive mortality occurs: we must glance at the mismanagement of those who are a grade above them,—well-paid mechanics and others who have a sufficient amount of income to fairly support their families. Amongst these there is an amount of ignorance of the laws of health which is really surprising: this frequently causes them to be careless of proper house accommodation, and makes them select situations which are deficient of drainage, and in other ways are injurious, particularly to children. Soothing syrups are largely used; and numerous instances might be mentioned of the fatal results of such mixtures. But a much more extensive cause of death is the manner in which many of the wives of the working and even middle classes are in the habit of feeding infants. In a vast number of instances, when the mother is in robust health, and in the way of having plenty of nutritious food, it is a common practice, instead of providing infants with milk as is appointed by nature, to load their stomachs with cakes, bakers' bread, and other improper matters, amongst which may be included roast beef, mutton, and bacon: these mothers have no idea of the capacity of a child's stomach, and allow it to take quantities of food which it has no power to digest. The consequences are convulsions and other fits, and a long train of dangerous disorders. In many neighbourhoods the medical attendants look constantly to being called upon during the night to children in consequence of their having been overfed.

The treatment of the most simple disorders is but little understood; and it does not seem to be much known that as children advance in years, attention to the varieties of food, the application of the hot-bath, mustard-plasters, and similar steps, will, in the early stages, care or prevent many disorders.

The education of women of the class to which we have last referred in the simple laws of healthy existence would yearly save thousands of lives, and add materially to the strength of our population.

AN EAGLE IN COPPER.

CONTEMPORARIES have already made known a very remarkable work executed in copper by Mr. Thos. Phillips, of Snow-hill, London; but we cannot allow it to pass by without a few words of description and praise. It represents a "golden eagle" in vigorous action, standing

"On the jag of a mountain crag:"

its wings are extended (they measure from tip to tip 5 feet 2¾ inches), and with open beak and flashing eye he screams defiance. Every portion is represented with scrupulous fidelity. The minute feathers which cluster round the neck, the fine hair-like down which runs from the beak to the eye, the cushion of plumage at the junction of the wings and body, are here separate, and can be each separately raised by the finger. The half-hairy, half-feathery legs of the bird are wonderful in the fineness of the down which overspreads them. The most extraordinary triumph of Mr. Phillips's skill, however, is shown in the extremely minute feathers which cover the frame of the pinions, and which conceal the fastenings of the large feathers forming the tips of the wings. The rock, a mass of tin and antimony in combination, is bold and effective. The metallic lustre of feathers, so difficult to imitate in painting, is rendered with great felicity. The maker says there are more than 10,000 feathers, formed from ordinary copper-plate, all made by hand, some of which had to pass twenty-six or twenty-seven times under the hammer and graver.

For six or seven years this work has been in hand; and it is most satisfactory to us to find that to this patient labour has been added artistic skill. He has not merely imitated feathers, but conveyed expression.

SANITARY SHORT-COMINGS IN LONDON.

METROPOLITAN medical officers of health have, from time to time, urged the necessity for more attention to be paid, particularly in the summer months, to the condition of mews; and it was recommended that some plan should be arranged for the regular removal of the refuse and the prevention of those accumulations which spread an impure atmosphere to some distance around. It was with surprise we noticed that a deputation had waited upon the Chief Commissioner of Works, consisting of Alderman Salomons and others, for the purpose of opposing this wholesome proposition.

These mews are mostly of considerable extent, formed behind rows of large and fashionable houses, by which they are hidden from the general view; and the circumstance of their being thus built in increases the necessity for the use of every sanitary precaution, not only for the preservation of the health of those dwelling around, but also of the animals which are lodged in the mews, and the men, women, and children who dwell, in numbers of cases, above them. During the winter months, when those engaged in the culture of land are at leisure, the refuse of stables and, indeed, every other description of decomposing matter is eagerly sought for and readily removed. In the summer and autumn time, when there is in crowded towns the greater call for attention to the purity of the atmosphere, farmers, being engaged in their fields, do not care so much as at other times for manure, which is often allowed to remain unmoved. Those dwelling near mews in well-conditioned houses know the unpleasant smells, particularly when the atmosphere is hot and dense, which come from them; and the evil gases they generate cause, no doubt, many attacks of sickness for which it seems otherwise difficult to accounnt.

It was owing to the irregular demand for manure that the monster dust-heaps, which eventually became so great a nuisance in London, were made to accumulate. After a severe battle, these have been removed; and we see, day after day, by means of the canals and otherwise, matters collected by the dust contractors conveyed to the country. Regularly as this work is done, it is in the mews and in poor neighbourhoods that the refuse is during the summer allowed to remain.

At certain seasons a load of horse manure in London is, to the extent of a few shillings, more valuable than at others; and, as it is mostly a perquisite of the stablemen, it is kept, notwithstanding the mischief which may be occasioned by it. It is very necessary that some measures should be adopted to enforce the regular removal of all refuse in the summer as well as in the winter. Our sketch represents a mews near Russell-square, and serves to recall to the mind the heaps of decomposing matters and other attendant circumstances which render such places dangerous to health.

The saying that "cleanliness is next to godliness" is an often-quoted truism, especially in connexion with the poorer classes of our large towns; but with many, cleanliness is actually impossible, owing to the want of a sufficient supply of that necessary of life on which the proper care of both homes and persons so particularly depends. It is disheartening to witness the scenes which occur daily in many places in densely-populated parts, where a good supply of water is most especially needed. We refer to this subject again; for the proper water-supply of such neighbourhoods is a matter of right to the neglected inhabitants, and could, with a little care and at trifling cost, be readily effected.

In Fryingpan-alley, Lamb-court, and other narrow passages which are teeming with human life, the manner of the water-supply, notwithstanding all that has been said, is in most respects not better than it was seven or eight years ago. In the afternoon, those who pass that way may see, on looking up the narrow entrances of these courts, crowds of women and children; and, on making a closer inspection, will find that there are from twenty-five to thirty people, provided with bottles, pails, tubs, tea-kettles, broken jugs, and other vessels. These people will tell you that they have not a drop of water in their houses; and, if you seem to doubt their word, they will take you to their miserable homes and show you that this is the fact; and you might examine twenty of these rooms, at from two till past three o'clock, and not find any water in nineteen of them.

The groups to which we have referred are waiting for the turncock to make the water flow from the main; and it is necessary to be in time, for many people want to be supplied, and it runs only twenty minutes.

At length the water issues from a lead pipe of not more than half an inch in diameter; and so small is the stream, that it is difficult, even for those who are provided with proper vessels, to get what is wanted; and some are so ill off in this respect, that they are not able to collect more than a gallon of water. How can the skin, the clothes, or the rooms be kept decent under such circumstances? At the best, these arrangements are bad; for, as our readers know, even if there be enough water taken into these apartments, the atmosphere is so vitiated that the water is spoiled and rendered unwholesome in a few hours. Even the placing of cisterns in such situations is not good, for the air is loaded with pollution.

In Fryingpan-alley, at the time of a recent visit, while the water was coming in, the smell from the closets and drains was abominable. The only safe plan is to allow—at any rate, from morning until evening—a constant supply, which the people may draw from the main.

In Lamb-court there is a small cistern, but it is of no use, for it is so broken that it will hold no water. We were glad, however, to learn that there is a supply on the Sunday mornings in this neighbourhood.

It is surely time that the disgraceful state of affairs to which we have pointed was ended; the loss, if any, to the water companies, by adopting better arrangements, would not be felt; it is, however, the more bounden duty of those who own and let these premises to ensure a proper supply of water by the payment to the companies of a sufficient sum for the purpose.

Drinking-fountains have been placed in our highways and byways; but in some of the dark courts and lanes pure water is as scarce as it is on board an emigrant ship during a long voyage.

Careful inquiry, in various districts, shows us that this evil is extensively spread, and that it needs a speedy remedy. We trust *soon*, in those situations, that with the poor inhabitants their "water shall be sure."

Sickness and death attend sanitary derangements as surely as the darkness follows the daylight. Unfortunately those principles are not so generally and so well understood as they ought to be. There are, moreover, instances in which even those who have studied this important matter are deceived, and are unable to account for derangements of health which are evidently caused by impurity of the atmosphere. A case which in a most striking manner illustrates this has been lately brought under our notice.

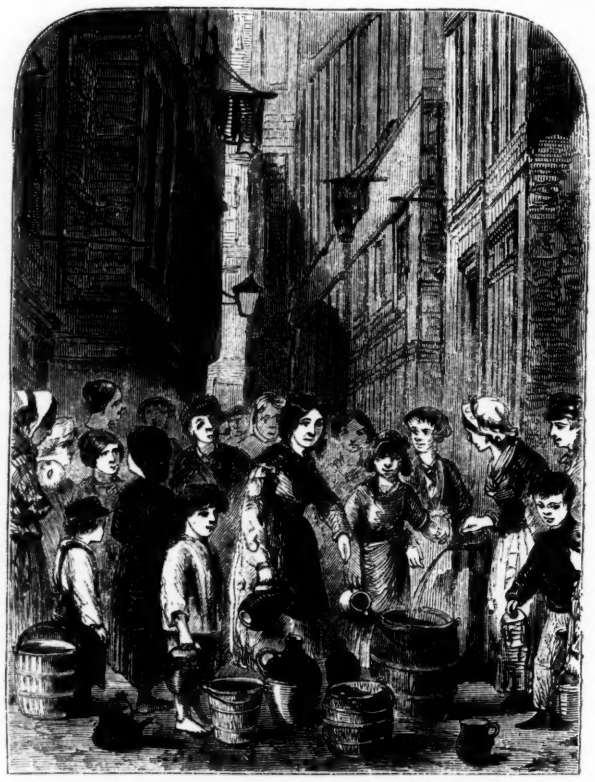
In a street in the north of London, which is composed of small cottage houses, there has been a great deal of illness. The dwellings are occupied by persons who are employed on the railway, at the post-office, and elsewhere; most of whom have large families of children; and for years past the place has been well known by the neighbouring medical men. Fevers and low pining sickness have been prevalent; and in the case of one house the medical attendant declared that the only chance of saving the children's lives was for the parents to move them away. In other houses, where the inmates were in comfortable circumstances, there have been serious and fatal attacks of illness; and it is satisfactory to note that in several instances the drain-pipe layer has followed the attendance of the doctor with good effect.

Of late, hooping-cough has been very severe; and, although to a certain extent the attack has been guided by the peculiar constitution of the children, it certainly has been more severe in those dwellings; and experience has shown that hooping-cough, measles, and other complaints peculiar to childhood, are greatly aggravated by impurities of the atmosphere.

In the house marked A on the little plan we have engraved, a child had been for more than a month suffering from a low intermitting fever, which up to the time of writing has baffled the power of medicine,—the child continuing to get daily weaker. Some time ago there had been a derangement of the drains, which had been set right; and, although examination was then made, there was no suspicion of the existence of a cesspool near.

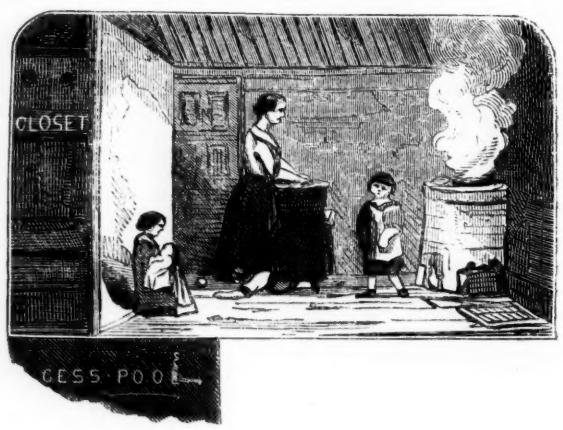
In the house B, the last tenant, who did his work at home, constantly complained of being ill, and left the place in consequence. Now the children there are ill of hooping-cough and measles. In the house C, nearly all the children are ill, and

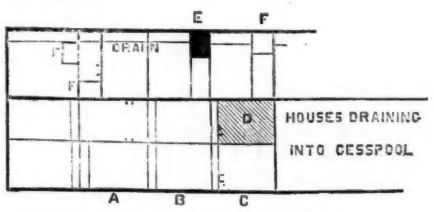
SANITARY SHORTCOMINGS: LONDON IN 1862.



WATER SUPPLY,—NO SUPPLY. FRYINGPAN ALLEY, CLERKENWELL.

A MEWS NEAR RUSSELL SQUARE.





SICKNESS IN THE WASH-HOUSE, AND WHY.

the doctor has been in frequent attendance for some time past. In the back room, D, two children died of hooping-cough and debility, and were buried on the same day.

In consequence of all this sickness, further examination of the drainage was made, and a large cesspool was found in the rear of the house, B. On raising the broken woodwork of the floor of the wash-house, a large pit completely filled with poisonous refuse was seen. There was no brick arch over the cesspool—no cover except the cracked boards, which were so much decayed it seemed providential that the children who were in the practice of playing over this pit had not fallen into it. Into this cesspool several houses to the northward drained; and a reference to the ground-plan will show how close this pestilential collection is to the room in which the two children died. The cesspool is marked E, and the closets of the other houses F. These are untrapped, and not properly supplied with water.

There is undoubtedly here sufficient proximate cause for disease; and we have mentioned the circumstance in the hope that this experience may lead others in doubtful cases of sickness to make careful sanitary investigation, and obtain the removal of matters which are dangerous to a whole neighbourhood. If we can even make the public connect cause and effect in this matter of health, we shall have done something towards amendment.

"ITALIAN SCULPTURE OF THE MIDDLE AGES AND PERIOD OF THE REVIVAL OF ART."

IN the account we gave in May last* of the opening of the new court at the South Kensington Museum, and of the works of Italian art deposited in it, we spoke at some length of the descriptive catalogue of the works forming that section of the Museum then in course of preparation by the curator, Mr. J. C. Robinson.† This has since been published, and will be found interesting not merely as a guide to the collection, but an outline history of sculpture at the period of the Revival. Without thinking quite so warmly of these works as Mr. Robinson does, we are quite at one with him in believing that the collection is of the greatest value in a historical point of view; and, moreover, that it points to a path by pursuing which sculptors of the present day may bring their art into the homes of the people. We want to see sculpture maintain its natural alliance with architecture, and generally applied to the embellishment of objects of use. The volume is fully illustrated with wood engravings, and of these we insert two specimens,—a view of the Cantoria, or singing gallery of Santa Maria Novella, Florence, of which we have already given a full description;‡ and a representation of a group of the Virgin and Child within a framework of fruit and flowers, and supported on a triangular bracket. It is a fine specimen of the work of Andrea della Robbia, of white enamel on a blue background. The encircling wreath and portions of the ornamental bracket, on the contrary, are enamelled with the most vivid and brilliant colours, proper to the fruit and foliage represented. The sharpness of execution of every part of the work, and the beauty of the enamel covering, render this a *chef-d'œuvre* of the art as practised by the Della Robbia family. It is obvious that every part was most carefully and minutely finished with the chisel, prior to the application of the enamel glaze; that is to say, the crude terra-cotta, after it came from the oven, was entirely worked over and elaborated like a carving in marble. It has fortunately been preserved with the utmost care, and is now literally as fresh and as perfect as on the day it was finished.

This work was one of the principal specimens of the Mediæval sculpture collection of the Campana Museum.

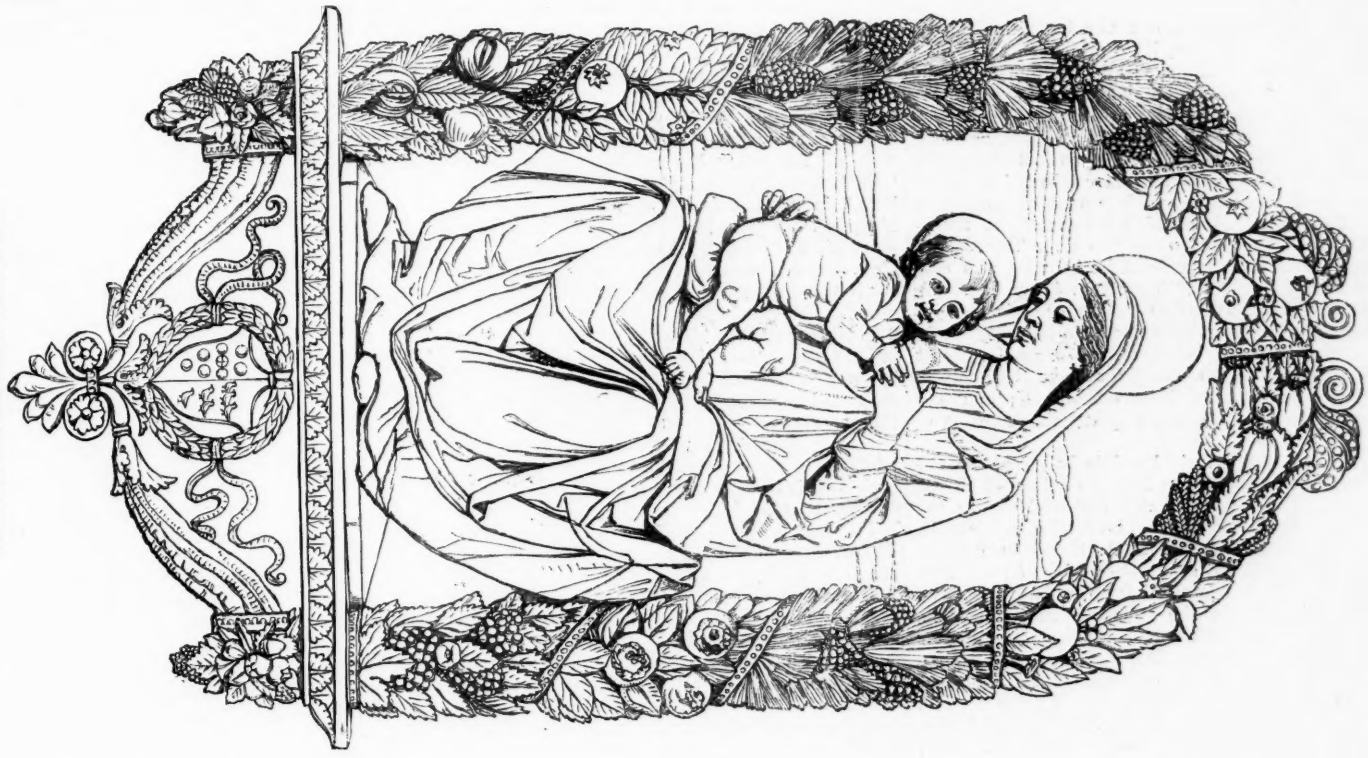
In another part of the work Mr. Robinson thus epitomises the break-up of the Campana collection, from which many of the specimens at Kensington came:—

"The Marchese Campana, director of the Monte di Pietà, or national pawnbroking establishment of the Papal Government, was a passionate amateur and collector of every class of works of art, but more particularly of objects of classical antiquity. During a series of years he accumulated an enormous number of specimens, for which, with an enthusiasm which frequently outran his judgment, he often paid extravagant prices. He also dis-

* See p. 305, *ante*.

† "Italian Sculpture of the Middle Ages and Period of the Revival of Art. By J. C. Robinson, F.S.A., Superintendent of the Art Collections of the South Kensington Museum. Chapman & Hall."

‡ See p. 305, *ante*.



ALTO-RELIEVO IN ENAMELLED TERRA-COTTA.

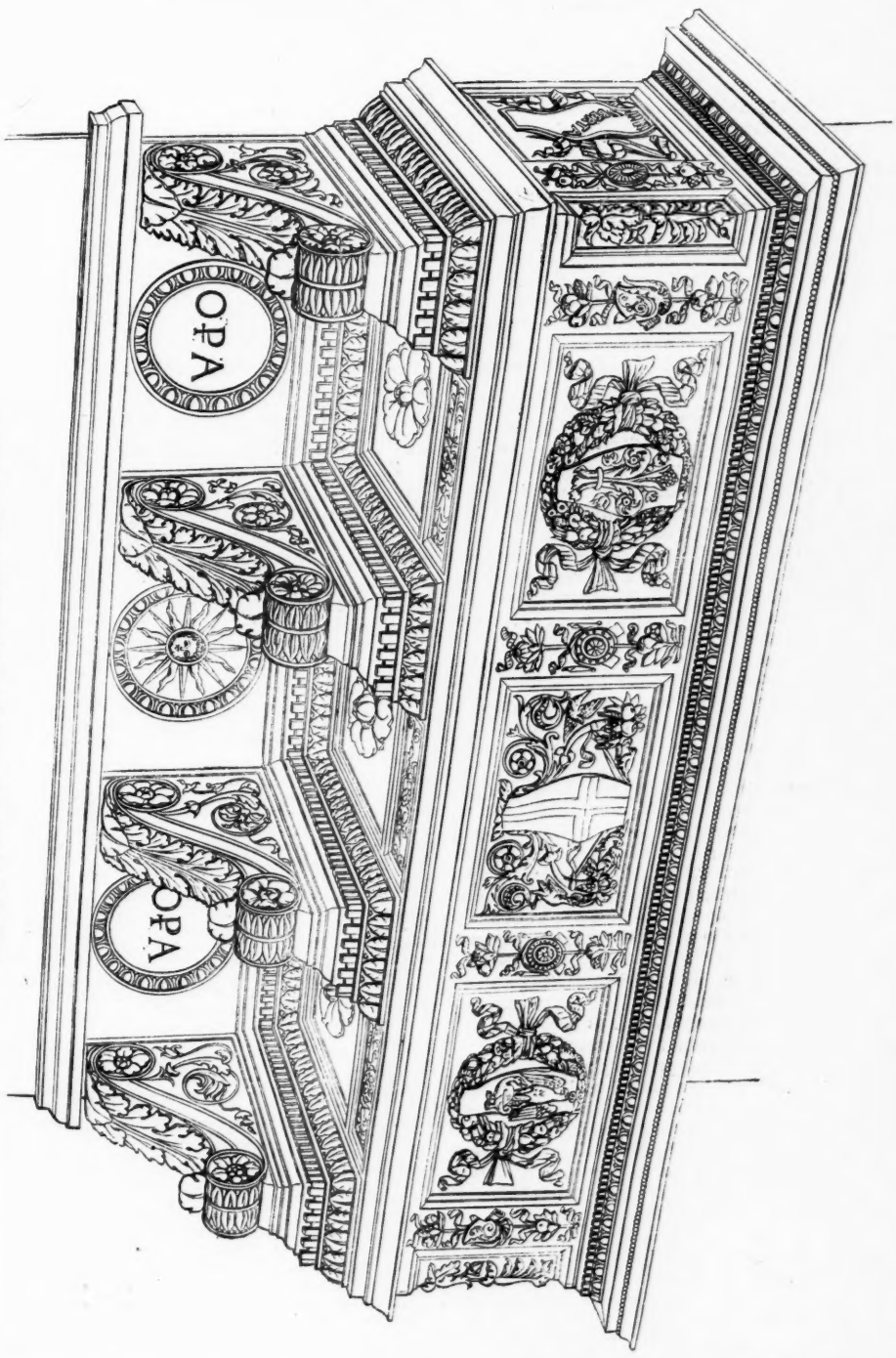
bursed large sums of money in conducting excavations for the discovery of antique remains. The outlay thus incurred led him to make use of the official funds of the establishment under his charge: it is stated, by Signor Campana's partisans, that this took place all along with the cognizance and sanction of the Papal Government, which allowed him to make advances to himself on the security of his collections. However this may have been, he was at last suddenly arrested, deprived of his office, and thrown into prison. His collections were sequestrated and handed over to the keeping of persons appointed by the Government, who were ordered to make a catalogue of the entire gatherings forthwith, with a view to the whole being sold to make good the alleged defalcations. The sum stated to be due was upwards of 200,000*l.*; Campana and his friends asserting that the collection was of much greater value. He remained in prison upwards of three years: finally, however, he was released; some pecuniary provision was made for him; and the collection was virtually taken by the State in satisfaction of its claim."

Negotiations were opened in England, as well as other countries, for the purchase of sections of the collection, but ended without result:—

"In the autumn of 1860, the writer being again in Italy, turned his attention once more to the Gigli-Campana collections, and the political occurrences of that period seeming to offer a chance for successful negotiation, which had never before presented itself, he lost no time in requesting authority to offer a certain sum for all such portions of the two collections as were desired. This authority was communicated to him; and after a lengthy negotiation, finally, towards the end of December 1860, the entire number of specimens originally selected—in all eighty-four—from both the Gigli and Campana collections, were purchased for the net sum of 5,836*l.*, being 1,314*l.* less than the amount owing to the Monte di Pietà for the Gigli collection alone. At the same time, in compliance with a stipulation insisted on from the outset, the Roman Government remitted the usual duty of 20 per cent. levied on the export of all ancient works of art from the city.

As the ultimate fate of the Campana collection still excites some interest, the further proceedings in respect to it may be briefly stated. The principle of allowing selections to be made having been established by the subtraction of the objects acquired by this Museum, the Papal authorities shortly afterwards acceded to an offer of the Russian Government for a selection from the antique sections; and an agent of that Government in the month of March, 1861, succeeded in negotiating the purchase of 767 objects, chiefly Greek painted vases, bronzes, and antique marbles, for the sum of 650,000 francs, or 26,000*l.* This selection, undoubtedly, comprised a great proportion of the most precious works in the classes from which the choice was made. Finally, intelligence of these successive transactions having been communicated to the French Government, two commissioners were dispatched with full powers to purchase the residue of the collection. This they effected in the month of June, 1861, for the sum of 4,364,440 francs, or 174,417*l.* The entire number of objects thus acquired was 11,835; but in this number only two of the more important of the twelve series into which the collection was divided—viz., those of the antique jewelry and ancient terra-cottas — were obtained by them intact."

Amongst the works illustrated and described in Mr. Robinson's book, but not yet set up, is the Tribune, or *Cappella Maggiore*, of the conventual church of Santa Chiara, Florence, originally erected in 1493. As a complete specimen of Florentine architecture of characteristic style, suggestive of Brunellesco, and illustrative of the modes of association of *Quattro-Cento* sculpture with architecture to be seen nowhere else out of Italy, it will be valuable.



MARBLE SINGING GALLERY, FROM SANTA MARIA NOVELLA, FLORENCE.

SOUTH AUSTRALIA.*

SOUTH AUSTRALIA is a new but rising colony. The city of Adelaide, its capital, contains not a few important buildings; and there many of the luxuries of life are obtainable in its numerous stores and shops. There are no less than thirty-three miles of made streets in Adelaide, provided with macadamized roadways, curbed footpaths, water-tables, &c. Water is conducted in pipes along all its streets, and into most of its houses, and is supplied at high pressure from water-works, by means of which the river Torrens has been turned to domestic and other uses, at a cost of nearly 250,000*l.*! The reservoir at Thorndon Park holds 150,000,000 gallons, or a six months' supply, so as to render the city independent in summer of the drying-up of the Torrens. Against fire, nearly 1,000 fire-plugs have been fixed. Public baths have been established; and the luxurious colonists contemplate the erection of Turkish baths.

Among the principal public buildings are, the Government House, an Italian edifice, which has recently been enlarged at a cost of 10,000*l.*; the new Government Offices, also in the Italian style, from a design by Mr. E. A. Hamilton, colonial architect, in 1857, at a cost of 13,000*l.*; the Parliament Houses, erected from a design by Mr. Bennet Hays, in the style of James I.'s time, and at a cost of about 15,000*l.*; the Supreme Court, with Grecian Doric portico and Italian flanks, built in 1849, at a cost of 10,000*l.*; the Post-office, Local Court House, and Police Station, in the Grecian style, with Italian clock-tower, and completed in 1850, at a cost of about 7,000*l.*; the Armoury, Police Barracks, &c., built from a design by Mr. Hays in the Tudor style, at a cost of 12,000*l.*; and the new Custom-house, Court-house, and Police Station, at Port Adelaide, designed by Mr. Hamilton in the Italian style, and built in 1861, at a cost of upwards of 7,000*l.* The Railway Terminus at Adelaide is an Italian edifice, erected under Mr. B. H. Babbage, C.E., in 1854, at a cost of about 7,000*l.* There are various public buildings of more or less importance, including court-houses and police-stations, dispersed over the Colony.

Copper is one of the chief products of South Australia, whose Burra-Burra mines have for some years been well known in this country for their rich produce. Wines are also produced, as well as wheat, wool, and other articles. Alpaca and Angora wool are among the South Australian products exhibited at the Palace of Art.

* "An Account of the Colony of South Australia, prepared for Distribution at the International Exhibition of 1862. By F. Sinnett. With Catalogue of Products exhibited. London: Burt, Holborn-hill. 1862."

THE ORCADIAN BARROW AT MAES-HOWE.

THE interest with which the cell and the runes at Maes-Howe were regarded will be in the recollection of our readers. The runes have now been translated; and Mr. Farrer, the senior member for South Durham, has just got printed for private circulation a "Notice" of the inscriptions. He had casts taken and drawings made with the greatest care and fidelity; and they were all submitted by him to some of the most celebrated Runic scholars of the age,—Professors Rafn, Stephens, and Munch. The result of their examinations (translations) is given in the notice referred to. The origin of Maes-Howe is, of course, most obscure; but it is nevertheless alluded to in the inscriptions, which, as was known, were less ancient in origin. "This barrow," says one of the Runes, "was formerly *a sorcery hall*, erected for Lodbrok: her sons were brave: such were men as they were for themselves (such we may call valiant men, such as they were in their achievements). The Iorsalafarar (visitors of Jerusalem) broke open Orkhow . . . . Earls. To the north-west a great treasure has been hid (but few believe that). A great treasure was hid here. Simon Sigr (victor) carved (the runes) and afterwards Jnge. Happy he who may discover this great wealth. Ogdonaegh carried away the goods from this barrow."

"A sorcery hall" was precisely what we anticipated that the Maes-howe cell would turn out to have been. Who "Lodbrok" was does not appear; but just as the cell at the New Grange barrow, in Ireland, was "dedicated to the Great Mother Ops," whose "house" it contained, side by side with "the tomb of the hero" who had undergone all the trials of initiation; so, probably, Lodbrok was the "goddess," or "great mother," to whom the "sorcery hall" of Maes-Howe was "dedicated" or "erected." This sorcery hall also reminds one of the mystic "hall of Ceredwyn," or the Great Mother Ceres, and of "the narrow bed beneath the tumulus," in which the Druidical hero, the Taliesin, was "made perfect." The New Grange tumulus, or "pyramid," as it has been also called, is said to be the very portrait of one described by Pausanias at Mycenæ in the Peloponnesus. We also find a close similitude of its internal arrangements, comprising "the house of the god" and "the tomb of the hero," in "the Dwarfy [or Pictish?] stone" of Hoy, in Orkney itself. This stone is a hollowed monolith, 36 feet long, 18 feet broad, and 9 feet high. At each end is a bed and pillow, worked out in the stone; and at the top is a round hole, probably for ventilation. The entrance is a hole 2 feet square, into which a square stone, still, or at least some years since, extant, could be fitted by way of a door. Herodotus describes just such another near Minerva's Temple at Sais, in Egypt.

Thus universal do those mysterious religious initiations seem to have been which comprise, in their requisite arrangements, such cells as those of Maes-Howe and Hoy, in Orkney; New Grange, in Ireland; Sais, and the Great Pyramid itself, in Egypt; Mycenæ, in the Peloponnesus; and many others in widely-different parts of the world.

The encyclopædiac and compendious Higgins, in alluding to some of these cells, says, "It seems not improbable that these stones may have been for the same religious purpose; *but what that may be*, or whether Druidical or not, *no one can say*." We have already, however, in the *Builder*, shown good reason to believe that such cells, or "narrow beds" and "sorcery halls," were used for religious or magical initiations and enchantments; in which entrancement, and the god-possession of the entranced, were the primary objects in view; the responses given to those who "inquired" of the Spirit which was evoked in the entranced constituting "the oracles" of the heathen. To this day, there is a tribe in the Himmalayas who, according to Hodgson and other writers in the "Transactions of the Asiatic Society," are in the habitual practice of entrancing a priest called "the Deoda," whom they then consult as an oracle, in a pavilion, or cell, constructed for the occasion. Among the American medicine-men, or thaumaturgical priest-physicians, and various other more or less savage and semi-civilized tribes of men, the Buddhists of Thibet inclusive, similar practices are also still adopted;* as, indeed, they are well known to have been in the temples generally of the ancient heathen.

* Abbé Huc, in his curious and interesting work on Thibet, gives a startling account of a strange process of enchantment which he says he witnessed in a Buddhist temple. A celebrated Lama was *seated on the altar*, surrounded by the Lamas or priests, who monotonously *chanted*, or enchanted, themselves and their central chief into a singular state of excitement, which culminated in the chief Lama committing the almost incredible act of temporarily cutting through the covering of his bowels with a cruciform slash, reminding one of the "happy despatch" of the Japanese, but by no means with a like result. The instant this was done [thus abnormally liberating "the life of the liver;" which, according to Plato, is "the Promethean seat of the spirit of prophecy*], the chief Lama was consulted as an oracle by the people present, through the surrounding priests; and, after numerous questions and responses, the chief Lama is said to have deliberately run his thumb over the incisions, which forthwith closed, like new-cut india-rubber, or as if it were by what a surgeon would call "healing by the first intention;" and shortly afterwards the Lama's abdomen displayed as little token of the recent horrific operation as the self-inflicted slashes of the Arabs are said to do after the religious furor, during which they also cut and slash themselves, has been expended. Were not Abbé Huc an evidently truthful and honest writer, one would feel greatly inclined to disbelieve his "strange story;" but, whatever illusion or deception the venerable Abbé may have laboured under; the story itself is sufficient for our purpose, if it tend to show that *oracular forms* are still extant. The seating of the supposed *god-possessed upon the altar* is also most significant and instructive.

* The liver of Prometheus, *the Foreseer* and brother of Epimetheus the Afterseer, grew, or increased, every *night*, and was consumed, or diminished, every *day*. "Looking into the liver" for *presages* was a well-known practice in ancient times, and is alluded to in the Bible.

PASSAGE OF THE TUDELA AND BILBAO RAILWAY ACROSS THE PYRENEES.

WE have already mentioned (in our early notice of the engineering works in the Palace of Art and Industry) the model which shows a portion of the Tudela and Bilbao Railway, crossing the great chain of the Cantabrian Pyrenees, between the Bay of Biscay and the valley of the river Ebro, in the north of Spain, exhibited by Mr. Vignoles, F.R.S., the engineer-in-chief. We are now enabled to add some particulars of the undertaking which may interest our readers.

The whole length of the railway is 155 miles, from the port of Bilbao to a point between the towns of Alfaro and Tudela, on the Ebro.

Only the crossing of the line over the Pyrenees is shown on the model. It is the first railway which has actually effected the passage of either of the two greatest mountain-ranges of Southern Europe; thus exhibiting the latest progressive step in civil engineering by one of the most singular railway undertakings hitherto realized. This line will be opened in the month of August of the present year, 1862.

The extent of railway on the model is only 36 miles, including the windings along the skirts of the mountains. Some of the peaks and cliffs, closely adjacent to the line, are from 3,000 to 4,000 feet above sea-level: most of the scarps and ravines are very steep, and in places exhibit from 400 to 700 feet face of perpendicular rock.

The size of the model is 20 feet in length, by 12 feet in breadth, covering an area of 240 square feet.

The horizontal scale is $\frac{1}{5000}$; *i.e.*, 416⅔ feet to an inch, or about 12⅔ inches to a mile; being the smallest scale on which the topography could have been well shown. To bring out the mountains and ravines effectively, the vertical scale is $\frac{1}{2500}$, or 166⅔ feet to an inch.

The outlines of the model were built up by Mr. Stephen Salter, of Hammersmith. The details were worked up by Mr. Henry Mathews and Mr. Christopher Bennison, the district engineers of that part of the railway, aided by Mr. Thomas Vignoles Croudace, the assistant engineer.

The model was coloured by Mr. Percival Skelton, who visited the localities for the express purpose of studying the characteristic features and appearance of the Cantabrian Pyrenees. The same gentleman executed the ten water-colour drawings which hang near, and the panoramic views filling the four panels enclosing the model.

This model will not be without attraction to the public generally; and to several classes it will be found to be extremely interesting,—to the geologist, the artist, the philosopher, to the military man, and most especially to the engineer.

It includes a portion of the country over which the Duke of Wellington had to conduct and manœuvre his troops previous to and during the battle of Vittoria, in the summer of 1813.

One or two chief characteristics of the principles of construction employed may be pointed out, as of general interest. The difficulty, amounting in many instances to impossibility, of obtaining the various requisite materials of suitable quality, or of getting them to the places where wanted, led to the adoption of large and very heavy embankments, at many points where it might, on a first view, have been considered that viaducts would have been the more economical mode of crossing the deep and formidable ravines. Again, in providing the openings for the passage of waters and roads under the heavy embankments, these passages have been in every instance built, not in the centre, but at the side of the embankments, in trenches cut into the solid; and the abutment walls being thus secured from lateral pressure, the arched tops of the culverts and bridges were gradually covered with successive layers of hard material, before the great mass of the embankment was brought over them.

A few general observations about the laying-out of the curves and gradients may also not be inappropriate.

It having been determined to construct a railway from the port of Bilbao to the interior of the country, at Miranda on the Ebro, and which should touch in its course the city of Orduña, it was first ascertained which was the lowest pass in that part of the mountains: this was found at Gujuli, 2,163 feet above the sea,—being probably the lowest in the whole Pyrenean range. It was then readily determined that the only practicable route was by the valley of the Nervion, the estuary of which river forms the port of Bilbao. It was also evident that, once entered, the Nervion valley could not be left again, until arriving near to the village of Amurrio, 21 miles from Bilbao: the rise in that distance is about 650 feet, and the average rate of ascent 31¼ feet per mile; that is, 1 in 169.

Near Amurrio it became possible to leave the Nervion, and ascend by lateral valleys; but two fatal objections existed—first, the line would have been a league distant from the city of Orduña; next, the difference in level between Amurrio and the Gujuli summit was upwards of 1,500 feet, and the direct distance only 7¼ miles, though this might probably have been lengthened to nearly 10 miles; thus, a gradient, either of 1 in 20 in the first instance, or of 1 in 33 in the next, would have

been necessary, besides most enormous works of construction in both cases.

The Nervion was therefore followed to the basin of Orduña; and, having gone thus far, the only subsequent practicable progress was to follow round this basin, to come out again on a much higher level, and then to wind along the skirts of the mountains to the Gujuli summit, in which ascent it became necessary to turn the two deep and wide valleys of Lezama and Ynoso.

By adopting this course the railway was brought within a quarter of a mile of the walls of Orduña; and from Amurrio to beyond Artómaña (a village nearly 5 miles from Orduña, and situate at the opposite side of the basin) there was obtained an average gradient of fully $\frac{1}{100}$ for more than $8\frac{3}{4}$ miles, with curves easier than those previously obtained, and at a very moderate cost of construction.

From Artómaña to the Gujuli summit there was but one course, that just described, and with a gradient of about 1 in 70 for nearly 12 miles. But, as in the case of the passage through the lower part of the Nervion valley, it was found necessary to have recourse to sharp curves; and at intervals, equal in the whole to half that long length of incline, the railway is on curves, and reversing curves, of scarcely more than 300 yards (280 mètres) radius; and it may be remarked, *that there are two points on the line (at the entrance of the basin or concha of Orduña), only 600 yards apart, as measured horizontally across the gorge, which are about $8\frac{1}{4}$ miles distant, in travelling along the railway*, and which differ 456 feet in level, or vertical elevation.

In the plains the cost was under 5,600*l.* per mile; whereas, through the heaviest parts of the Cantabrian Pyrenees, it amounts to nearly 28,000*l.* per mile. The average expense of the railway throughout is under 12,000*l.* per mile. These sums include land, works, permanent way, fencing, telegraph, &c., but are exclusive of buildings, fittings, and accommodations at stations, of rolling stock, of management, and of interest to shareholders during construction.

After making provision for the items last added, the average cost of the 155 miles will not exceed 16,000*l.* per mile.

It is right to say that this work is wholly due to the spirit of enterprise and knowledge of sound commercial principles displayed by the merchants and citizens of Bilbao, associated with some few of the inhabitants of one or two of the chief towns on the line of railway, and certain of their fellow-countrymen and correspondents in the Havana and in England.

The contract for the part of the railway from Bilbao through the mountains to Miranda, on the Ebro (known as the second section, and about 66 English miles in length), was carried out by Messrs. Brassey, Paxton, & Co., of London.

The works on the portion of the railway extending along the right bank of the river Ebro for about 89 English miles, called the first section, were undertaken by various local Spanish contractors.

Mr. Henry Vignoles is the principal resident engineer.

THE AGE OF ENGLISH TREES.

OAKS and yews, the most venerable of our trees, are, in several instances, so old that it is difficult to form an estimate of the time which has passed since they were planted. Several oaks felled in Sherwood Forest, about a quarter of a century ago, exposed, on being sawn up, the date 1212, and the mark or cipher of King John; and it has been calculated that these trees must have been several centuries old at the time the marks were made. It is well known that the oak which is said to have proved fatal

> "To that red king, who, while of yore
> Thro' Bolder-wood the chase he led,
> By his loved huntsman's arrow bled,"

was standing, not long since, in the New Forest, in Hampshire: they who think this tree insufficient to record a fact of so ancient a date should be reminded that Sir Thomas Dick Lauder says, "Seven hundred years make no extraordinary period in the existence of an oak: some oaks blown down in Donnington Park were supposed by the interior rings to have been nearly 800 years old; and it is supposed, on good authority, that there still exist in England oaks which were in existence at the commencement of the Christian era." A venerable oak stood not long since at Tormond Wood, in Stirlingshire, under which, tradition says, William Wallace convened his followers. There are vestiges of the ancient Druids in the neighbourhood of this tree, which was 22 feet in circumference. There is another famous Scotch oak called the Wallace Oak, at Elderslie, near the place where Wallace was born. There are other oaks in Great Britain which are probably more than 1,000 years old. The most useful age of this tree, for building and other purposes, is from about 50 to 70 years.

The oldest known elm is said to have been that at Checquers, Buckinghamshire, and is supposed to have been planted in the reign of King Stephen. The elm does not seem to live so long in the vicinity of towns as in the pure country air. Queen Elizabeth is said to have planted an elm with her own hands at Chelsea: this was felled in 1745, and sold for a mere trifle. There are some fine trees of this kind in St. James's Park and Hyde Park: many of them have within the last dozen years suffered much by decay, storms of wind, &c. One of the elms planted by Sir Francis Bacon, in the year 1600, in Gray's Inn, was felled in 1725, in consequence of its commencing to decay: it was then more than 28 feet 6 inches in circumference near the root. The elms in the vicinity of the metropolis are much worm-eaten.

The mulberry seems to have been chiefly introduced into England by King James I., who was anxious to establish the culture of silk in this country. The king caused 10,000 mulberry plants to be purchased and distributed throughout the country. They were delivered in London at the rate of three farthings each. The mulberry-tree said to have been planted by Shakspeare, in New Place, was felled by the Rev. Francis Gastrell in 1756. Not longer than fifteen or sixteen years ago there were both mulberry-trees and vines growing on the spot which had been used as the garden of the Priory of St. Bartholomew the Great, Smithfield.

The horse-chestnut is a native of Northern Asia. Thence it was brought to Constantinople, Vienna, Paris; and it was, in the year 1712, first introduced into England. This tree is of very quick growth. Plants which have been raised from the nuts have grown to a large size in twelve or fifteen years.

In the days gone by, before fire-arms had put out of fashion the use of the bow, the culture of the yew was an important matter; but the growth of this tree was very slow, and the demand for wood of a tough, durable, and elastic nature, for bows, was so great, that the home supply of yew wood was found insufficient; and merchants were for a long time obliged by law to import four staves with every ton of goods coming from places where bow-staves could be brought, and ten staves with every butt of Malmsey from Venice. When we consider the very slow growth of the yew, and the large size to which some still in existence have grown, it seems probable that their age is not less than that of some of the famous British oaks. Many have been recorded of the circumference of 26 feet, and there are some even larger than this. In Fotheringale churchyard, in Perthshire, is an old yew, much shattered, and nearly dead, the trunk of which measures 56 feet 6 inches in circumference.

There are in England about fifty varieties of the willow, all of them of rapid growth. The famous weeping willow planted by Pope came from Spain, inclosing a present from Lady Suffolk. When the covering was taken off, the poet observed that the pieces of stick appeared as if they had some vegetation. Under the idea that it might perhaps produce something which we have not in England, he planted one in his garden, and it produced the willow-tree which gave birth to so many others. So rapid is the growth of this tree that we have noticed several which have become of large size in about fifteen or twenty years from the time at which they were planted.

The Scotch fir, the silver fir, the Norway spruce fir—which was first brought to England upwards of a century ago,—the pine, in its various and picturesque forms, are all of rapid growth, and have, by the extent to which they have been planted, added much to the beauty of many parts of England.

The beautiful beech—which in point of size follows next to the oak and ash, and is found in great perfection in many parts of this country—is useful in the arts and manufactures: the wood is fine and durable, and is the best of any for turning, making toys, wheelwright's machinery, cabinet-makers' articles, Tunbridge ware, the piles for the foundations of bridges and other buildings; and, throughout the rural districts, the

> "Beech makes their chests, their beds, and their joined stools:
> Beech makes the board, the platters, and the bowls."

The hazel, if allowed time to grow, will yield poles 20 feet and upwards in length, which would be useful for various purposes. The tough bending ash, gives to the peasant part of the material for his plough, and to the prince important portions of the carriage in which he rides: wheels, palisades, hop-poles, tool-handles, walking-sticks, ladders, carts, and a hundred other articles of every-day use, are made of the wood of this tree.

The thin twigs of the birch were formerly, in connexion with education, more familiar to school-boys than they are at present. The wood of this tree is, however, useful in many other ways. In those parts of the Highlands of Scotland where pine is not to be had, the birch is the timber used for man purposes. The stronger stems are the rafters of the cabin: wattles of the boughs are the walls and the doors: even chests and boxes are made of it with rude workmanship. With the Highlander it often forms his spade, his plough, cart, and even for the harness, cordage is twisted with the small sprigs.

The maple, or sycamore, often grows to a large size: one at Knowle, in Kent, was 12 or 14 feet in girth. The original plantations of Vauxhall and Mary-le-Bone Gardens were chiefly of the great maple. It is not considered to live to a great age; yet some have been noticed at Cambridge in a flourishing state at the age of 185 years. Before the use of crockery became so general as it is at present, the wood of the maple-tree was common material for bowls and platters. It does not readily warp or splinter: it is, therefore, employed in making saddle-trees, founders' patterns, &c.

The common holly, at full growth, is generally from 20 to 30 feet high; but it has been seen of the extraordinary height of 60 feet. The timber of the holly is very white and compact: it, however, retains the sap, and takes a long time to season. The growth of this tree is very slow; it can be used in the manufacture of what is called Tunbridge ware; for some common kinds of engraving, instead of pear-tree, or box-wood; and, dyed black, it is at times worked by cabinet-makers, instead of ebony.

There are several varieties of the lime which seem to stand the smoke, &c., of cities better than other tall-growing trees. It is said that the two first lime-trees which were planted in England (1590) are still growing at Halstead, in Kent. There is, however, much difference of opinion respecting the time of the introduction of this tree. This wood is much used by mould and other carvers. Gibbons, in the time of Charles II., decorated various important buildings with it. Many lime-trees are more than a century old.

The walnut-tree grows rapidly in England. There is a record of one of those trees growing in Scotland in the year 1684. It was more valuable before the extensive introduction of mahogany and other foreign woods than it is now. During the French war, the great demand for musket and pistol stocks thinned the walnut-trees in this country. At that time so great was the demand for this timber, that a large sound tree has often been sold for 600*l.*, when cut into gun-stocks. The hawthorn is quick-growing when young; but when left to stand till it become a tree, it makes wood very slowly, and lives to a great age. The plane-tree was first introduced into England in 1623.

The cypress grows to a great age, and, in some cases, to an immense size. It is recorded that one grew in Persia which was supposed to be two thousand five hundred years old. The cypress is one of the most durable of woods.

The crab-apple, pear, and cherry-tree, afford closely-grained woods, which are used in several ways, as is the box-wood which grows in England.

HAMPSTEAD HEATH.

EACH session of Parliament, notwithstanding the discouragement which the measure has received, renewed attempts are made by the lord of the manor to obtain permission to build upon this open and picturesque ground; which is every month, as the metropolis extends in this direction, becoming of greater value to the pent-up Londoners. Not many years will have passed, if building be continued to the same extent as it is at present, before the Heath will be joined to North London by houses, and surrounded on all sides by dwellings: then the value of this range of land would be greater than we can just now conceive.

Meetings have been held in Marylebone, St. Pancras, and elsewhere, for the purpose of opposing Sir Thomas Marion Wilson's Bill; and it is probable that the powers which that gentleman seeks will be refused on this occasion, as it has been on others, by the House of Commons; but, unless arrangements can be made, there is nothing to prevent the next possessor of this property from building on it if he thinks proper; and it can scarcely be expected that this right—which is of large money-value—will be waived,

without fair and reasonable compensation. It therefore becomes an important matter for serious consideration, how arrangements can be best made to secure this land for the public use. First, we should clearly understand the present value of the lord of the manor's claim, and then see what means can be best employed to raise the necessary sum of money which will secure this estate from the risk of building operations.

The views from Hampstead Heath, in one way stretching to Windsor Castle, are beautiful; and with skilful landscape gardening the bold features of this ground might be made more striking and picturesque than any of the metropolitan parks. If the margin of such a park were clearly defined, there might be still portions of ground left which could be profitably disposed of without interfering with a good general plan.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE nineteenth annual meeting will be held in Leicester, August 4th to 9th, inclusive.

The list of readers of papers already announced includes,—Mr. Planché, "On the Earls of Leicester;" Mr. T. Wright, "On the Ancient MSS. at the Guildhall," and "On an Inscribed Tile of the Eighth Legion, found at Leicester;" Mr. Thompson, "On the History of the County of Leicester, to the time of the Norman Conquest;" Mr. Gordon Hills, "On the Guildhall, Leicester;" Mr. Raphael Brandon, "On St. Martin's Church, Leicester;" Mr. Roberts, "On other Churches in Leicester," and "On Brixworth Church;" Rev. C. H. Hartshorne, "On Queen Eleanor's Cross;" Mr. Irving, "On the Camps, Earthworks, and Fortifications of Leicestershire;" Mr. H. Syer Cuming, "On Memorials of Richard III."

ST. MARY'S HOSPITAL, BEDDINGTON.

THIS building was opened on the 17th instant. The plan of the hospital comprises a central hall, with a common kitchen attached, and eight almshouses, which, with the offices under an ambulatory, form the quadrangle first proposed to be built; but a second quadrangle can be added. The hall, with four of the alms-houses and offices, is a memorial to the late rector; and two more alms-houses are being added as a memorial to the late Sir Henry and Lady Bridges, of Beddington House. The hospital is being erected from the plans of Mr. Joseph Clarke, F.S.A. The external walls are of flint, with Bath-stone dressings; and the roofs tiled; the inner walls to the quadrangle of red brick. The hall has an open roof, with a bell-cot. The walls are panelled; and at the upper end is a bay-window. The windows in the hall have been filled with diapered glass by Mr. Charles Hudson. Over the open fire-place is a brass, recording the foundation, &c. In the centre of the hall is a massive table for the inmates to use it as a reading-table, and for dining on certain festive days.

Each alms-house has two rooms, with separate coal-places, larders, &c.; and each room carefully ventilated, and all the little requirements for domestic comfort considered. Attached are good offices, and store places for wood, coals, &c. The centre of the quadrangle is to be laid out in beds and paths, filled with flowers, which will form a pleasing feature in the general appearance, and give a place of quietude to the inmates. In the centre is a well of good water, off the chalk.

MEMORIALS AND STATUES.

Memorial of the late Bishop Villiers.—A mural and inscribed monumental tablet has just been completed in marble by Mr. Craiggs, of the Steam Marble Works, Newcastle, and which is about to be placed in the chapel at Auckland Castle. It consists of a white marble tablet on black ground. On the lower portion the mitre is carved in relief.

The Crompton Statue, Bolton.—Arrangements have been made for the inauguration of the memorial to Samuel Crompton, the inventor of the spinning-mule, and which is to be placed in Nelson-square, Bolton, on the 10th September next. There is to be a public procession, an oratorio (the "Creation"), a banquet, &c.

Model of Monument for the Well at Cawnpore. A very interesting but melancholy addition has been made to the International Exhibition; the interest of which, as a contribution to the Exhibition, is enhanced by the fact of its having been sent by Lord Canning a few days before his death. It has been placed in the English architectural gallery, and consists of a model of the monument which is being erected by the Government of India over the fatal well at Cawnpore. The monument was designed by Colonel Yule, of the Bengal Engineers, and is being executed under the superintendence of Mr. C. B. Thornhill, of the Bengal Civil Service. The original is in Chunar sandstone, and the gate giving entrance to the well within is of gun-metal. The late Lord Canning gave a piece of sculpture to be placed over the well, which is still in the hands of Baron Marochetti. When all is finished the entire monument will be surrounded by an ornamental garden watered from the Ganges Canal. The present model is finished in Agra soapstone. It was made by native stonecutters at Allahabad, and is on the scale of half an inch to the foot. Over the door giving entrance to the well is the simple and touching inscription, "These be they which came out of great tribulation;" while round the rim of the well itself (which, of course, is closed and built over) is carved the following inscription: "Sacred to the perpetual memory of a great company of Christian people, chiefly women and children; who, near this spot, were cruelly massacred by the followers of the rebel Nana Dhoondopunt of Bithoor; and cast, the dying with the dead, into the well below, on the 15th day of July, 1857."

SCHOOL-BUILDING NEWS.

Gravesend.—The chief stone of a new ragged school has been laid here by Lord Darnley.

Rochdale.—The first stone of a new church school has been laid at Hamer by Mr. J. S. Entwisle. The building will cost about 650*l.*, and the whole of it has been collected except about 100*l.* It will be licensed for divine service. Mr. Entwisle, after laying the stone, offered to give land for the erection of a church in his park. The school will consist of two wings, respectively 55 feet by 18 feet, and 52 feet by 18 feet, also a class-room 20 feet by 18 feet. The height of the school will be 12 feet from the floor to the square of the brickwork, and the roof will be an open one. The windows will have white brick dressings, and will be divided by stone mullions. There will be separate playgrounds for the male and female scholars.

Great Bromley, Colchester.—A day-school, with offices attached, is about to be erected at Great Bromley, from designs of Mr. Henry W. Hayward, of Colchester. Mr. Capon, of Manningtree, is the contractor.

CHURCH-BUILDING NEWS.

Lincoln.—A new stone figure, representing one of the early English kings, has just been placed in the west front of Lincoln Cathedral, by direction of the precentor.

West Torrington.—The church of St. Mary, West Torrington, Lincolnshire, has been reopened, after being restored by Mr. R. J. Withers, at a cost of about 650*l.* Mr. Fox, of Lincoln, was the contractor.

Widford.—The rebuilt church of Widford has been reopened. The edifice in style is Geometrical Middle Pointed. The external walls are of Kentish rag-stone, in hammer-dressed courses, with Bath dressings. The roofs and floors are of Baltic timber, and the covering of Staffordshire tiles. The whole of the seats and other fittings are of wainscot oak, excepting the organ-case, which is made of the oak from the roof of the former church. The church has a chancel 24 feet by 16 feet; nave, 48 feet by 18 feet; north aisle, 48 feet by 10 feet; south porch, 9 feet by 8 feet 6 inches; sacristy, 12 feet by 11 feet; with organ-chamber over, of the same size, on the north of the chancel; and a tower, 17 feet square and 51 feet high, with a spire, 72 feet—in all, 123 feet. There are stalls and subsellæ (for the choir), sanctuary rails, and sedilia and piscina. The arcade between the nave and north aisle is of five arches, with piers, alternately octangular and cylindrical. The chancel arch has moulded and shafted piers, the central shaft being of coloured Plymouth marble. There are also shafts of coloured marble to the traceried arches between the organ-chamber and the church. The roofs are all open, and have arched ribs springing from stone corbels at intervals of 12 feet, with intermediate principals. The walls are 17 feet high to the plates, which are moulded; and the roof rises to the height of 31 feet from the floor line. The chancel roof is somewhat lower. The ceilings are of plaster, and are formed between the rafters; the timbers being left without stain or varnish. The tower has a belfry stage, with splayed, moulded, and shafted windows. The spire is an octagonal broach, with spire lights on the cardinal faces, and pinnacles on the angles of the tower: a spiral staircase on the south face of the tower gives access to the bell stage. A small octagonal turret, with octagon roof on the north side, forms the staircase of the organ-chamber. The east window of the chancel is of three lights, and has a painted-glass window by Messrs. Powell & Son. The remainder of the glazing is in diamond quarries of cathedral glass. The paving of the chancel is of encaustic tiles. The remainder of the church is laid with plain thin tiles. There is a considerable amount of carving in the building, which has been executed by Mr. T. Earp, of London. The apparatus for warming the church has been provided by Messrs. Haden, of Trowbridge. The bells, six in number, were made by Messrs. Warner & Sons. The works have been executed by Messrs. Patman & Fotheringham, of London, builders.

Winchester.—The Dean and Chapter have resolved that the massive fragment of ancient wall which stands in front of the porch of the southern aisle of the cathedral shall be destroyed. The roadway from the square to the west front has not yet been commenced.

Pershore.—A vestry meeting for Holy Cross restoration has been held, at which resolutions were unanimously passed approving the proposed repairs and restoration. Upwards of 4,100*l.* have been subscribed, of which sum 2,000*l.* have been received. The committee appointed to carry out the work (says a local paper) have communicated with fourteen persons (whose names have been suggested to them); and the church, with the specifications and drawings, will remain open for inspection for a month. During this period the contracts must be prepared and sent in.

Nymphsfield.—The parish church of Nymphsfield having become much decayed, it was found necessary to rebuild it. All except its tower is now taken down, and preparations are being made for laying the foundation-stone on the 29th inst., by the Earl of Ducie, lord-lieutenant of the county. Such was the condition of this church, according to the *Gloucester Chronicle*, that the roof was only held together by the laths and plaster on which the heavy tiles were placed: the timbers being rotten the whole mass leaned against the tower; and, thrusting out the walls, rendered it peculiarly dangerous to the congregation. The new nave, aisle, and chancel, under the direction of Mr. Teulon, of London, architect, will be rebuilt.

Ashley.—The parish church here has been reopened. The building had become so dilapidated and unsuited to the wants of the increased population that it became ultimately indispensable to effect a change; and the restoration, or rather rebuilding, of the church commenced about two years ago. The church (says the *Staffordshire Advertiser*) is enlarged by an addition at the chancel end; and by an entire re-arrangement of the seats, which are open, many additional sittings are obtained; so that the edifice, originally calculated to accommodate 160, will now seat 360. The two mortuary chapels, that of the Lords Gerard of Bromley; or rather, at the present time, of the Meynell Ingram family; on the north side, and that more recently constructed for the Kinnersly family on the south (previously enclosed), are now thrown open to the church, with the exception of a screenwork of wood; so that the ancient monument of the Gerards and the monuments of the Kinnersly family are visible. The architect employed was Mr. Ashdown, of London. Mr. Tunnicliffe, churchwarden, voluntarily undertook the supervision of the building; and the carving has been executed by Messrs. Gladwin, of Stoke-upon-Trent, under the superintendence of Mr. F. Gladwin. The total cost will be about 3,000*l.*, towards which 2,100*l.* have been promised. In excavating beneath the window of the old chancel an embalmed body was discovered, supposed to be that of Lady Gerard, who died at Joppa, and was transferred to the family vault at Ashley.

Pendleton.—The foundation-stone of Bethesda Methodist New Connexion Chapel was laid, at Pendleton, by Mr. E. Whittaker, of Hurst. The site is that on which stood the old chapel, erected in 1806, and which has been taken down for the purpose of erecting a more commodious edifice. The new building will be in the Grecian style of architecture, with Renaissance in the details, and the side vestries will have projecting porticoes. The arrangement of the seats will be segmental in form, and radiating from the pulpit as a centre. There will be a circular gallery all round the building, and the organ and choir will be located over the front entrance. Ventilation will be secured by a series of iron panels inserted in the cove of the ceiling, through which the impure air

will escape, whilst fresh air will be conveyed through tubes and admitted through perforated ironwork in the window-seats. The chapel will be erected by Messrs. Metcalf & Waterson, of Manchester, from the plans of Mr. R. Scrivener, of Hanley, architect. It will seat 780 persons, and the estimated cost is 2,000*l.*

STAINED GLASS.

Westminster Abbey.—Messrs. Wailes, of Newcastle, have just completed a stained-glass window, to be erected in Westminster Abbey, to perpetuate the memory of the Stephensons. In the body of the window (says the *Gateshead Observer*, in describing it) some of the greatest architectural and engineering works of ancient and modern times are represented; and above these, at the top of the window, in five-foil, bust portraits of eminent engineers are appropriately arranged. The figure of Robert Stephenson is placed in the centre; above, his father, George Stephenson; on one side, Thomas Telford; on the other, John Smeaton; and below these, James Watt and John Rennie. To give to modern costume that more imposing and dignified appearance which belongs to the robes of the ancients, a scarf is thrown over the shoulders of each individual; and, though strict fidelity was not aimed at in the portraits, the artist (adds the writer) has produced striking likenesses, while the richness and variety of the colours give to the whole group a most resplendent appearance. The architectural works represented are bordered with ornamental tracery on each side. They consist of, on the one half of the window, the Ark, the erecting of the Tabernacle, the first Temple, the second Temple, and Mehai Bridge; and on the other half, the building of Nineveh, the Treasure Cities of Egypt, Aqueduct near Pygro, the Colosseum at Rome, and the High-Level Bridge at Newcastle.

Church of Divine Unity, Newcastle.—The congregation of this church have decided that the subject of the memorial window, in honour of the late Rev. George Harris, shall be "St. Paul Preaching at Athens." At a congregational meeting, Mr. Joseph Clephan in the chair, Mr. Wailes's design for the window was unanimously approved; and it was resolved that an order be at once given for its execution. The window (which will form the fifth memorial window in this church) will probably be inserted by the 24th of August next, the anniversary of the passing of the Act of Uniformity in 1662.

St. Martin at Palace, Norwich.—A stained-glass window has been erected in the south aisle of this church by subscription. The subject is the parable of "The Good Samaritan." In one light the traveller is attacked by the thieves: in the centre the good Samaritan is pouring in oil and wine; and in the third light the wounded man is being conducted to the inn. The window is less advantageously placed than those in the east end of the building, as the light is injured by the palace gateway and the trees on the south side of the church. The window was executed by Mr. J. H. Gathercole, of Norwich.

Longhope Church, Hereford.—A memorial window of stained glass has been placed in the parish church of this village, to the memory of the late pastor, Mr. Guise. The design consists of a central piece representing our Saviour giving his last charge to the Apostle Peter—"Feed my Sheep," &c.; and on either hand are arrayed his disciples witnessing the scene.

PROVINCIAL NEWS.

Worcester.—The new police station is in progress. The contractors are Messrs. Hemming & Son, builders, Lowesmoor. The building was designed by Mr. H. Rowe, the city surveyor, under whose supervision it is being erected. It comprises a superintendent's residence and private office, charge-room, and cells, with a residence for a married police officer, an office for the inspector of weights and measures, a large room over for the general use of the police, and another room for the inspection and testing of gas and gas meters. Connected with the superintendent's private office, there will be the charge room where prisoners will be received after apprehension. Next to this are two corridors, each containing three cells, one set for male, the other for female, prisoners. Each of these corridors will be fitted up with a small lavatory for the use of the prisoners. The cells will be furnished with abundance of light and ventilation. Their warmth will be supplied by hot water circulating along pipes throughout the corridors; the necessary apparatus being fixed in the basement. The foul air will pass through extraction flues in the cells; and thence be carried into a foul-air flue, continued in a vertical shaft till it gets mixed with the outer atmosphere. Light is afforded by means of a window in each cell; and in each there is a ventilator, by which the heat may be regulated.

York.—At a recent meeting of the Council, a report on the progress of the Lendal Bridge, by Mr. Page, was read. From this report it appears that the masonry and brickwork forming the increased lengths of the west ends of the abutments have been brought up to the same height as the old masonry, or 22 feet 9 inches above the summer water-level. On the west end of the archway, under the Lendal approach, the old masonry forming the face has been rebuilt, the increased length of the archway is finished, and the approach wall between it and the abutment has been carried up to nearly its full height. On the west side of the south approach the retaining wall and the extension of the side walls of the bridge under the approach are carried up to about the springing level of the iron girders. Regarding the ironwork, the east outer rib has been completed some time, and the west one only requires the key-piece to complete it also. Other portions of both iron and stone work are also in progress. On the motion for adopting the report, which was agreed to, it was stated that 23,000*l.* were spent; and, according to the estimate of Mr. Page, the bridge, when completed, would cost from 30,000*l.* to 31,000*l.* Whether he would keep within the estimate or not the committee could not say. It was thought best by the Council that Mr. Page should have a *carte blanche*, and that he should finish the bridge.

Wigtown.—Arrangements are now in progress for commencing the erection of new buildings for the county of Wigtown. The buildings are to be of two stories, and will occupy the east side of the square in the centre of the town. They comprise a room for the ordinary sheriff-court and other business of the county; besides offices for the sheriff and the other officials; and, in addition, an assembly-room for the use of the county. In connexion with the building, there will be the electric telegraph office, and an armoury-room, in which are to be deposited the arms of the volunteers. The old tower and spire of the present building will be altered and converted into a clock-tower, in the same style as that of the general design,—the Flemish. The elevation of the tower will be 80 feet. The cost of the whole will be close on 600*l.*

Inverury.—The foundation-stone of the new town-house for the royal burgh of Inverury has been laid. The new building is situate at the back of the site of the former town-house and parish schools, both of which are to be removed and the square extended. The hall forming the top of the square has a front exposure to the High-street. The style of the building is Classical, and taken from a plan by Mr. J. R. Mackenzie, architect, Aberdeen. It will have a centre building, and a wing at each side, covering a frontal of 88½ feet; a passage at each side, 10 feet in breadth, leading to the back of the building. The depth is 63 feet. The front of the centre will be of dressed granite, ornamented with pilasters of the Roman Doric order, supporting an entablature. The principal door in front will be approached by a flight of six steps; and the windows in the centre will be circular-headed. Along the top of the centre building will be placed an ornamental balustrade in granite. The spire, to be placed in the centre of the building, is to be built for a clock and bell, and will also be ornamental with finials. The height from the ground to the base of the tower will be 48 feet, and from the base to the top of the spire 40 feet, making the height 88 feet in all. The front of the wing buildings will be of dressed granite, with square windows. The market-hall is on the west side of the centre. This hall is 27 feet long by 17½ feet wide, and has three small offices, and other accommodation, for the use of cornfactors and those transacting business. On the east side, and also opening from the corridor, are the cells and constables' apartments. On the upper floor, and at the back of the building, will be the large public hall. It will measure 55 feet in length, and 30 feet in breadth. In the front of the upper floor will be the council-chamber, retiring-room, town clerk's room, committee-room, and record-room. The apartments in the west wing will be appropriated for a dwelling-house and accommodation for the sergeant of police, and weights and measures' office. The left wing will be set apart for accommodation to the town's officers. The cost will be about 2,500*l.* The inhabitants enjoy entire exemption from usual local assessments—such as for lighting, police, &c.; and the income from the town's property is so large that the magistrates will be able to pay off the loan of 2,000*l.* for this their latest public acquisition, at the rate of 100*l.* a year, besides meeting interest. The principal contractors, who some time ago began the building, are Messrs. Munro & Stewart, builders, Inverury; the others being Messrs. Warrack & Daniel, Aberdeen, for the wood work; Robertson & Son, Inverury, for the slate work; H. Gordon & Co. for the plumber work; while Messrs. Gibson & Co., Inverury, supply the plaster work.

A NEW STYLE.

HOW CAN IT BE FORMED?

IF the inevitable New Zealander who is to sketch the ruins of St. Paul's from London-bridge should be anything of an antiquary, he will be sorely troubled to eliminate the history of the English nation from its writings in brick and stone. If the history of architecture be the history of the human mind, his researches will indicate a very chaotic mental state on the part of the present generation. Giants in science, we are pigmies in art; and, until the necessity of art is brought home to every man's door, we cannot hope to attain to unity of feeling or consistency of practice. Architecture is not treated by us as a plant of indigenous growth, to flourish in every man's garden; but rather as a choice exotic nurtured in a glass-house, to be exhibited only upon grand occasions. Fine art in building is looked upon as an intellectual toy, not as an æsthetic necessity; and it is the duty of architects to promote and educate that taste for artistic refinement without which we differ from the barbarian only in commauding a higher degree of physical comfort, or in the possession of greater intellectual power. Did we possess an art the natural offspring of our wants, it would be unnecessary to consult clients respecting the style they wish to adopt, whether Gothic or Classic, Thirteenth Century or Tudor, Elizabethan or Moresque. Such pastry-cook's orders would then never be given. Style would not be considered a garment to be changed as the fashion of the hour might dictate, but the clothing of beauty on the structure of utility.

Let us, then, agree to establish some broad principles of action, that we may work in unison for the attainment of a common goal; and the creation of a new style will follow with rapidity and success. At present we possess more food than our weak digestive functions can assimilate. To invent a new combination that will attain by development to the dignity of a new style, it will be necessary to consider the exigences of modern wants, and the character that would accord best with contemporary ideas. A foundation of reason must be constructed before we can safely erect a superstructure of fancy. It is, I am aware, much easier to perceive the inconsistencies of modern practice than to point out a way to remedy them; but the discovery of defects must naturally precede the desire for improvement. The Italian style is generally recognized as the one most suited to modern requirements. As an adaptation of the Classic, it conforms and fashions itself to the common-sense arrangements usually demanded; but it does not admit of that freedom of artistic treatment desirable; for it is difficult to forget its classic progenitor. The combinations and forms requisite to retain the character of the style seem well-nigh exhausted, and they certainly are limited. Rectangularity is its distinguishing feature, to which the circle and other forms are only subjective. Square reveals, square soffits, and square openings prevail. The cornices, architraves, bands, pilasters,—all partake of this character. The cyma, cavetto, or ogee are inevitable as the crowning mould of a string or cornice; and I have frequently seen draughtsmen puzzling their brains, with no effect, to produce even a new detail or a new cornice. Must there not, then, be something very unpliable in the style as at present used? Look at our streets! Moulding after moulding, architrave after architrave, cornice after cornice, pediment after pediment, is repeated, again and again, without variation and without taste. Could some new elements be introduced into the style, what a revolution it would effect! Why not adopt the splay, the shaft, the circular head, the clustered and deeply-sunk mouldings, the varied carving, the tracery-pierced spandrel-head, and the interlacing work that gives such interest and richness to the Gothic? To apply these features, it would be necessary to give them more breadth and

strength of character, that they might fitly assist to decorate a style that would, when fully developed, be eminently distinguished by dignity, elegance, and structural truth. The splayed reveals of the openings might, instead of presenting a flat surface to the eye, be decorated with mouldings and shafts, grouped in characteristic forms; and for the enrichment there are Norman ornaments to suggest endless varieties of decoration, if worked out by refined hands. The heads of all window or door openings would admit of an infinite variety of treatment; and, by the adoption of a free style of design, the edifice may be crowned by a cornice, rich in mouldings, enrichments, carved blocks, stopped chamfers, and other spirited ornament, not admissible in the pure Classic type.

What is required is a free style, in which every architect may display individuality of detail. Upon detail the character of every style hinges; and if we once get rid of precedent, and attend only to the qualities necessary for good composition,—such as breadth, repose, proportion, richness, elegance,—originality would soon result. The little I have suggested gives only a faint glimmering of what I am convinced may be done in the way of combination; and the object to be aimed at is to adapt to our purposes the richness and versatility of the Gothic; and, while avoiding the mere repetition of Mediæval feeling, to seize upon new forms that will constantly suggest themselves to the fancy. Once the main idea of the style is fixed in the mind, the commonest object will yield materials for thoughtful application. Ornament must be selected with patience, and applied with judgment. Let every architect ponder upon the effects developed in the buildings he sees around him: he will then learn what to reject and what to apply. Let him study composition from the best examples within his reach, and he will acquire a fund of practical knowledge in art that he might in vain attempt to acquire from mere drawings. Good taste demands that ornament should be placed where it can best be seen, and where it helps to emphasize the meaning of the composition: it is intended to give life to monotonous mouldings, but should be subordinated to structure and utility: distinctness should be aimed at above, finish below. To attain to a broad, rich, and refined style, we must not copy half-developed and barbarous ornament; neither can we hope to acquire ideality and creative power, by imitating matured art. Our vast quarries of art-material should yield but the raw product for us to fashion and shape into forms of ever-varying beauty. There is not a lecture or work upon the history of architecture but the influences of one art upon another are pointed out in it; how the ideas of one race are adopted and assimilated by those of another; and how original styles have been developed therefrom. Strange that it should never have struck any of our eminent men that a similar course would lead to similar results, with the additional advantage now, that the new style would be developed, not blindly but intelligently; and that, our art-stores being so much greater, the result would be proportionate. The public looks for common sense first: to us is the task of beautifying what it demands.

T. MELLARD READE.

VENTILATE THE STAIRCASE.

FEW will deny that the passages and staircase are, to use a simile, "the lungs" of a house, which require good air and ventilation; both of which might be easily had, by simply hinging the fanlights over the outer doors, so as to open and shut; which, to my thinking, ought to be an imperative law. All would find how sweet and wholesome dwellings—before not so—are rendered by this cheap and easy expedient. But I am afraid, like my former suggestion of perforated coal-plates, few will adopt it. Londoners seem to me to prefer ill health, drugs, and physic, to pure air and VENTILATION.

"WORKMEN AND CHURCHES."

SIR,—I ventured to suggest that builders, seeing the vast numbers of hands they employ, and the very small proportion who go to church, should personally interest themselves in the matter; and, as one means, should even offer the use of a workshop in which one of the men might read the church service, and perhaps read a sermon from one of the old divines. A correspondent of yours answers that the men do not go to church because they "are repelled by the modern form of sermonizing." This may be one reason; though I still think the expense of a pew is the chief reason. If any one doubts this, let him watch those who leave almost any suburban church, and he will find they are almost wholly of the middle class. The gay dresses of the ladies would quite put out of countenance the modest attire of the mechanic's wife and family. I repeat, that as churches are now built, those who cannot pay have no business there. Your correspondent says,—"Why not use mechanics' institutes and national schools?" and answers his own question by saying they cannot be had. If they could, half the difficulty would be got rid of. For want of anything better, I say let builders and large employers of labour give a workshop for the purpose.

Your correspondent, in answer to my reminding employers of their responsibility to God, answers,—"Alas! sir, my own experience proves that few, very few, trouble themselves about this responsibility;" just the very reason why I wrote on the subject.

You have set the good example, in your exposures of the lodging-houses, &c., of going a step beyond the mere material and scientific relations of building; and I merely follow where you lead by reminding employers that every one of them, or, I should say, "*of us*," has great influence over his men; and he will one day have to account for the manner in which he uses that influence.

I am happy to be able to add that a friend of mine, who has suitable premises, is about to carry out my suggestions. J. P. W.

DECISIONS UNDER THE BUILDING ACT.

ON Thursday, at Clerkenwell police court, Mr. Metcalf was summoned, as occupier, for nonpayment of a fee. He pleaded payment of builder's account, which included fee. Ordered to pay fee, and cost of summons, as occupier.

Wooden Erections near International Exhibition.—At Hammersmith Court, Mr. Donaldson, the district surveyor of South Kensington, attended before Mr. Dayman in support of two summonses, against Mr. Charles Hubbard and another, the owners of refreshment-booths in Cromwell-road, for erecting their buildings without giving notice, as required by the 41st section of the Building Act. Mr. Lawrence, instructed by the solicitor to her Majesty's Board of Works, attended in support of the summonses; and Mr. Murphy, instructed by Mr. Morgan, appeared for the defendant, Mr. Hubbard. The proceedings created some interest on account of it being understood that steps would be taken with respect to the other wooden buildings in Cromwell-road. A number of wooden erections have been built on the vacant ground in the Cromwell-road, and they have been opened as refreshment-booths. One question in dispute was whether the erections were buildings within the meaning of the Act. Mr. Murphy said that, in the event of his worship deciding against his client, he should ask for a special case, to be argued in the Court of Queen's Bench; and he would submit that, in order to save time, a case should be granted at once. Mr. Dayman said that before he could grant a case he must hear the summons, as he was bound to state the reason of the case being granted. After some conversation, the summonses were adjourned until the 14th of August, for both sides to agree upon the facts to be argued. The present condition of things in Cromwell-road is little creditable to those concerned, and should at once be rectified. If we understand the matter rightly, the powers of the district surveyor are set aside by an Act of Parliament obtained by the Commissioners of the 1851 Exhibition.

RECOVERY OF CHARGE FOR MAKING ESTIMATE BY A BUILDER.

Goss v. *The Torquay Cemetery Company.*—At the Newton Abbot County Court, the plaintiff sought to recover from the defendants the sum of 4*l.* 17s. 6d., for services rendered as a surveyor.

This was an action brought by Mr. Goss, who was a builder and surveyor residing at Torquay, to recover the sum of 4*l.* 17s. 6d. for services rendered in making an estimate of the cost of a chapel, which was proposed to be built on the unconsecrated grounds of the Torquay Cemetery. His charge was at the rate of 1½ per cent. on his estimate, which was 325*l.* He should show that a resolution was passed at a meeting of the company, by which Mr. Gribble, who was the standing architect of the company, was instructed to invite Mr. Goss and two other builders and surveyors, Mr. Mayne and Mr. Harvey, to tender for the proposed chapel. Mr. Goss always declined to tender unless the competition was limited; and it was clearly understood, in this case, that the competition was to be limited to the three builders and surveyors that had been named, and that the lowest tender of the three would be accepted. Accordingly, by the day appointed for that purpose, Mr. Goss and the others had sent in their tenders, but they were all refused. An uproar resulted at the meeting of the company, in consequence of the injustice done to those who had tendered. Mr. Goss sent in the lowest tender, and therefore he was entitled to the job; and he now sought to recover the benefit of his services which he had rendered to the company. He would admit that, if Mr. Goss's tender had been accepted, he would have made no charge for the estimate.

The Judge, Mr. Fortescue, suggested that the action should have been brought to recover damages for breach of contract.

Mr. Bennett, the secretary of the company, produced the book containing the minutes of the meeting held on the 4th of March, and read the resolution requesting Mr. Gribble to submit the plans to three builders of the town for their estimates and tenders, and to submit the same to the directors at a future meeting to be held for that purpose. At a subsequent meeting, however, it was ordered that notices should be issued inviting public competition for the erection of the chapel, and stating that the directors did not bind themselves to accept the lowest or any tender. At a meeting held on April 1st, Mr. John Angel's tender was accepted.

Mr. W. A. Goss, the plaintiff, said he remembered Mr. Gribble calling upon him and asking if it would suit witness to give a price for building a chapel. Witness asked on what terms—whether there was to be public or limited competition; and Mr. Gribble replied, "It is to be limited to three, yourself, Mr. Mayne, and Mr. Harvey; that is, supposing you all three consent. Mr. Harvey has consented; and if you consent there will be only Mr. Mayne to ask." Witness then gave his consent, with the proviso that the competition was to be limited; and added, "I am to understand that this is a private competition, and one of the three is to have the job." Mr. Gribble responded, "Most certainly." Witness took it for granted that the lowest tender would be accepted, as that was customary. He sent in a tender for 325*l.*, and it was the lowest of the three. There was 10*l.* difference between the three. One and a half per cent. was a fair charge for an estimate.

In cross-examination, plaintiff admitted having authorized the insertion of three advertisements in newspapers, in which the following words were respectively used:—"Estimates for every kind of work free of charge." "Estimates free of charge given for any kind of work." "Estimates given free of charge for all kinds of work." Witness explained that, by those expressions, he meant that if a job was guaranteed to him, he would give the estimates free, and save the party the professional fees. He said he should not think of giving an estimate free unless the job was guaranteed to him.

Mr. Carter, for defendants, contended that there was insufficient evidence.

His Honour was of a different opinion.

Mr. Carter then addressed the court for the defendants, contending that there was no legal contract between the parties.

The Judge gave verdict for the plaintiff for the full amount claimed.

RAILWAY COMPENSATION CASE.

DOCTORS DIFFER.

A REFERENCE was proceeded with last week in the Chancery Court, St. George's Hall, Liverpool, which elicited evidence even more than usually conflicting. The Birkenhead and Chester Railway Company are making a branch line from Hooton station to Helsby; and, being desirous of giving increased width at the Hooton junction, are about to have sidings between the Hooton Bridge and the one nearer Chester; so that goods wagons may be shunted upon these sidings. Mr. Robert Morris was the purchaser of the Low Fields property, in 1849, which contains 349 acres, and was at that time bisected by the railway. The company require a slice of land of about 17 yards wide on each side of the present line to make the sidings in question; and as it was only a widening of an existing line, and they required altogether a little less than eight statute acres, they offered Mr. Morris 1,578*l.* for the land. This offer was declined, and a reference was necessary. Mr. Morris was represented by Mr. Picton; the company by Mr. Culshaw; and the umpire was Mr. Harmood Banner, jun. Mr. J. Horatio Lloyd, and the recorder, Mr. Aspinall, were the counsel for Mr. Morris; and Mr. Bovill, Q.C., M.P., and Mr. Deighton, were retained for the company.

According to a report in the *Liverpool Journal*, Mr. Robert Morris stated that he had 349 acres of land, which he purchased in 1849 for 10,650*l.*, or about 30*l.* 10s. per acre; but that he estimated his subsequent expenditure in improving the house, building farm-buildings, drainage, and planting, at 10,000*l.* The house, distant from the station 170 yards, was let for 210*l.* per annum; and he let 180 acres of the land last year at prices averaging from 35s. to 40s. per acre, he paying all the rates and taxes.

Mr. William Cole valued the land required, which has no buildings upon it, but is purely agricultural, at 4,824*l.*, the actual quantity being 7 acres 3 roods and 36 perches. He valued the depreciation to the residue of the property at 8,682*l.*, making a total sum of 13,506*l.* 7s. 5d., which he thought the company ought to pay. Agricultural land was worth about 60*l.* or 70*l.* an acre in that locality.

Mr. Joseph Boult, architect, valued the land and depreciation at 10,779*l.* 9s. 6d.

Mr. J. Hampson, of Manchester, valued it at 6,891*l.*

Mr. Statter valued it at 6,250*l.* 7s.

Mr. Horner, architect, made it amount to 13,002*l.*

Mr. Walter Scott's valuation was 5,423*l.* 12s.

Mr. Gee, architect, agreed with Mr. Scott, in the sum of 5,423*l.* 12s.

Mr. Young, land-surveyor, valued the land and depreciation at 6,502*l.* 15s.

Mr. Shelmerdine, surveyor, stated his opinion that Mr. Morris ought to receive the sum of 12,598*l.*, and Mr. B. Williams 10,938*l.*

Mr. Bovill addressed the referees, contending that the land was merely two narrow slips of common agricultural land; that there was no severance of the estate, for that existed, and had been paid for many years before the land was purchased by Mr. Morris; that the land would actually be benefited by the contemplated improvements of the company. On behalf of the company,

Mr. Henry White, land-surveyor of Warrington, valued the land and compensation at 1,497*l.*; his opinion being that 35s. per acre was the fair annual value of the land; and he gave 30 per cent. for compulsory sale, and 40*l.* for any supposed depreciation.

Mr. Charles Townsend, of Chester, surveyor, valued the land and compensation at 1,280*l.*

Mr. Hoggins, of Chester, land-surveyor, valued it at 1,460*l.*

Mr. Alderman S. Holme valued it at 1,156*l.*, giving only 300*l.* for any depreciation of the house; but stating it as his opinion that depreciation of the house was imaginary: although he gave Mr. Morris the benefit of any doubt, he had added 300*l.* to the value of the land, which he took as worth 2*l.* per acre per annum, and at 33 years' purchase. It was elicited from Mr. Holme that the land immediately abutting on the station at Crewe was now twenty times more valuable than it was before the North-Western Company commenced their buildings.

Mr. John Davies, of Mollington, land-surveyor, valued the whole purchase and compensation at 1,480*l.*

Mr. John Palin, of Chester, land-surveyor, valued the amount at 1,386*l.*

Mr. James Harrison, of Chester, surveyor, made it 1,397*l.*

Other witnesses followed to the same effect.

Mr. J. H. Lloyd having replied upon the whole case, it was concluded.—The referees have not yet made their award.

Miscellanea.

NEW MATERIAL FOR PAVEMENT.—In the Rue Druot, a street opposite the Rue Richelieu, on the Boulevard des Italiens, a powder, of the colour of ground coffee, and smoking hot, is spread down and then beaten, not violently, with a smooth flat iron at the end of a handle. Over the surface so formed a large iron is run by a man so as to remove all inequalities. In a few minutes, it is said, there is a hard substance resembling asphalte.

THE ARCHÆOLOGICAL INSTITUTE.—The Institute is holding its annual meeting at Worcester. We will give some particulars next week.

LAYING THE FOUNDATION-STONE OF THE ROMAN CATHOLIC UNIVERSITY, DUBLIN. — This ceremony was performed, on the 20th July, by Dr. Dixon. About 8,000 persons walked in procession with banners and bands. The bishops, in their robes, attended in close carriages. In the evening a banquet was given at Allhallows' College. A great meeting was to be held to renew agitation for the grant.

THE MADELEINE.—"The Madeleine, although one of the modern churches of Paris," says the *Siècle*, "is now undergoing extensive repairs. The flight of steps at the northern front has suffered so much from the infiltration of the rain water that it is found necessary to reconstruct it. The same operation was performed at the southern front some years ago. Repairs of a still more serious character have also been found indispensable. Owing to the settling of the foundations, a crack has recently made its appearance in the principal front, extending from the lintel of the grand portal quite to the top of the inner pediment."

DOVER WATERWORKS.—At the last meeting of the Dover Local Board the following tenders were received for the enlargement of the waterworks:—Contract A. There was only one tender, that of Messrs. Simpson & Co., London, for 1,400*l.*, which was accordingly accepted. Contract B:—

Stiff & Richardson	£6,923	0	0
J. Moxon & Co.	6,230	0	0
J. Millichamp	7,587	0	0
E. W. Richardson	7,075	4	0
A. Matthews	5,803	13	3½
Fry & Pepper	5,516	4	0

A question arose as to whether the Board could receive the tender of Messrs. Fry & Pepper, inasmuch as it was unaccompanied by a bill of quantities,—one of the stipulations in the tendering. After some conversation had taken place upon the subject, it was decided that the parties should be sent for; and, if not prepared with a bill of quantities, that the tender should be thrown out as being informal. Mr. Fry afterwards attended, and said he was quite ready to comply at once with the requirement of the Board, and the tender was accordingly accepted.

DIBDEN'S GRAVE, IN THE BURIAL GROUND OF ST. MARTIN'S-IN-THE-FIELDS. — Dibdin, one of the most famous of the English song-writers, rests, as we have before mentioned, in this ground. The grave is covered with a flat stone, which is shaded by a weeping willow; the whole forming a picturesque little scene. It seems, however, that this memorial of one whose name is so familiar is rapidly falling into decay; and, if not cared for, the inscription will soon become illegible. The expense of such a work as recutting this would be but trifling; and it seems only necessary to make the circumstance known to cause some of the large number of persons who admire Dibden's soul-stirring sea-songs to undertake the restoration of the monument which marks his grave. The person who is in charge of the ground would direct any visitor to the spot; and thence it is not far distant to the burial-ground of St. Giles's-in-the-Fields, in which is the tomb of Sir John Soane, the founder of the museum in Lincoln's-inn-fields. This, like the last, is well backed by the grey foliage of a willow and by shrubbery.

BESSEMER'S PROCESS IN AMERICA.—At the Franklin Institute, Mr. J. W. Nystrom exhibited some specimens of iron and steel, manufactured at his establishment, Gloucester, N.J., by the process known as Bessemer's, and made the following observations:—"The cast-iron is smelted in an ordinary cupola, from which it is run into a barrel-shaped furnace, where air is blown into the molten iron for about ten to fifteen minntes,—the time required for decarbonising it to steel or wrought-iron; after which it is run direct from the steel furnace into moulds of any desired shape. Ingots thus cast can be taken direct to a rolling-mill or steam-hammer, and worked in the one original heat. The steel furnace now in operation is for acting on 3,000 lb. cast-iron at a time, which gives about 2,500 lb. of wrought-iron or steel. By the process known as Bessemer's the ingots are rolled out to finished iron in the first original heat, and slag is hardly perceptible. A great many parts of machinery which in Europe are made of wrought-iron or steel are in this country made of cast-iron. Now, by this process, such parts can be cast direct of steel or iron, which will materially reduce the weight and increase the durability of the machinery. I consider the process to be of the greatest importance for railroad iron, such as wheels, tires, frog-plates, rails, &c."

RAILWAY BRIDGES OVER ROADS. — For the protection of the public passing under railway bridges in the course of construction, would it not be as well to have a galvanized wire-guard fixed, to prevent rivets, &c., falling on the heads of passers-by? On the 18th I was walking under the railway-bridge, in the York-road, with my son, when a large rivet, red-hot, fell about half a yard from us.—R. R. P.

ROMAN REMAINS AT MALTON.—A place of ancient sepulture has been discovered at Norton. An excavation was being made for sand; but the section of the ground showed that the site was one of a large pit which had at some remote period been thrown out and re-filled with a different material, chiefly very black soil. At a depth of about 6 feet a large stone was met with. This stone was 4 feet 6 inches long, and 2 feet 2 inches wide, and has been hewn into a diamond shape. Beneath it were found the remains of a cist, containing human bones, and much Roman pottery in fragments. A Roman road formerly passed near the place.

THE WORCESTER MODEL DWELLINGS ASSOCIATION.—The eighth annual meeting of this association has been held at the Guildhall, Worcester; Lord Northwick in the chair. The report of the governors announced a sufficient balance to pay a dividend of one per cent. on the capital stock, but did not recommend a division this year, as they were compelled to anticipate some necessary repairs for the buildings. The report stated that during the past year the dwellings had been well filled, and the rentals regularly paid, the arrears being only 3*l.* 2s. 11d. The report was adopted; and after a discussion it was decided not to declare a dividend this year.

LAMBETH SUSPENSION BRIDGE.—The progress of this new bridge (at present the only adaptation of wire ropes in the construction of bridges across the Thames) has been rapid during the last few weeks. Already half the iron roadway, with its projecting brackets at the sides for the support of the passengers' footway, has been attached to the iron-wire ropes (which latter weigh nearly 150 tons, and have cost about 6,000*l.*) by diagonal ties. The cables were manufactured by Messrs. Newall, in a small workshop at the Lambeth side of the bridge. The workmen are busily engaged upon the approaches of the bridge; the Westminster end of which is opposite Market-street; the Lambeth end being approached from Church-street. The total cost of the bridge will be 40,000*l.*

IMPROVEMENTS IN HYDRAULIC PRESSES.—For many purposes for which presses are employed, the press is required, during a considerable portion of its stroke, to exert but a comparatively small pressure; whilst, for the latter portion of the stroke a much heavier pressure is required. In such cases, Mr. M. Scott, of Parliament-street, proposes to employ a compound press, consisting of two or more concentric cylinders. The important feature in the invention is the blocking of one press, whilst a more powerful one is caused to act against it thus:—Two separate hydraulic presses, the one of small and the other of large power, may be arranged, one at each end of a frame: the material to be pressed between them is received between the two presses, and is partly compressed by the press of smaller power; then this is blocked by inclosing water in it, and the press of greater power is put in action to complete the compression. This arrangement may also be employed where mechanical blocking is used in place of, or together with, water blocking.

GAS.—The York City Corporation have determined to erect gas-works for themselves, as they consider the charges of the local Gas Company for city lamps excessive, and find the directors not open to reason on the subject. "The citizens," says the *York Herald*, "are now paying 4s. 6d. per 1,000 feet for gas; and, according to Mr. Alderman Anderson, the company is not only dividing ten per cent.; but, in addition, are so overburdened with their profits that they are actually proposing to fall back upon a clause in their Act, enabling them to make up the dividends of bygone years, when they paid less than ten per cent., to that sum; and it must also be borne in mind that they are paying this heavy dividend on two if not three capitals. Still, notwithstanding this, they refuse to listen to any remonstrance, and coolly say to the committee,—'You cannot help yourselves: we will charge you 4s. 9d.: you can get it for no less; and therefore we shall charge you no less.' The cost of erecting works in these days of scientific progress would not be great; and the 2,000*l.* now annually paid for gas would be more than sufficient to pay the interest of the money expended in buildings and plant, as well as cover the cost of the manufacture of the gas required for the public lamps."

MUSIC AND ODOUR.—Mr. Piesse believes that he has discovered a gamut of odours: he has arranged forty-six simple essences according to what may be called their tones; and he finds that concord and discord are produced as in music. Rose and geranium, for instance, says the *Literary Budget*, which has "verified this curious fact," are both C: smelt together, you at once discern that these two perfumes have the same tone; rose being an octave higher than the other. The same is true of orris and calamus, of almond and violet. There is perhaps something, after all, in the blind man's idea, that the scarlet colour must be like the sound of a trumpet!

WORKMEN'S DINNER.—On Saturday last, the workmen employed by Messrs. Dove, Brothers, builders, Islington, celebrated their annual beanfeast at the Rye House. The company consisted of a large portion of the men employed on their various London works, in number about 120, accompanied in many instances by their wives and sweethearts. Mr. F. J. Dove presided, supported by Messrs. G. and H. Dove, and several of the foremen. The dinner gave entire satisfaction. After dinner there was a variety of amusements. Tea followed; and the party left the Rye House at eight o'clock, and arrived again in London shortly after twelve, after having spent a day which was thoroughly enjoyed by all. [Notices of several similar meetings have reached us; but we cannot do more than show that such agreeable gatherings are taking place, and that good feelings between employers and their workmen are promoted.]

SOCIETY OF ANTIQUARIES, NEWCASTLE-ON-TYNE.—The country meeting of this society has just been held. The excursionists left the central station by the Newcastle and Carlisle Railway, with the 10.15 a.m. train; the first scene on the programme to be visited being the picturesque ruins of Prudhoe Castle, the residence of Mr. C. U. Laws, of Newcastle. The site of the castle is supposed to have been the Roman station of the first cohort of the Batavi. St. Mary's Church, Ovingham, the burial-place of Thomas Bewick, the father of English wood engraving, was then visited; the Rev. George Bigge, perpetual curate, accompanying the party. The ancient market-cross has disappeared, but a fac-simile, as near as could be ascertained, has been placed on the site. The head of the original cross was found here, and was in the possession of the Rev. Mr. Bigge till about three months ago, when it was stolen, and the robbery has been laid to the charge of "some enthusiastic antiquary, whose virtue could not withstand the temptation." The date of the main part of the church is about the end of the twelfth century. The parsonage-house was formerly a cell of the Abbey of Hexham. The present house contains a room in which many famous men were educated under Mr. Birkett, Thomas Bewick having been one of his pupils. The party afterwards returned to Prudhoe Castle, where they were entertained by the resident. It was found at the close of the repast to be too late to visit the other places set down in the programme.

THE NEW PARISIAN HOTEL.—The new Grand Hôtel de la Paix, situate at the end of the street of the same name, on the Boulevard des Capucines, adjoining the new Grand Opera, has been opened. It is of prodigious dimensions, many of its internal corridors running to a length of 120 yards. In external shape it exhibits an isosceles triangle, of which the base faces on to the Boulevard. The entire basement story is occupied by shops, uniformly painted and decorated in black and gold, and from which the stone building above rises. The rents in this choice business position may be estimated from the fact that the *Café Glacier*, on the side facing the Grand Opera, has been let for a hundred thousand francs, or 4,000*l.* per annum. The building itself is five stories high; and over the principal entrance are six groups of caryatides, of two figures each. In the interior are three large courtyards, upon the largest of which, covered with glass like that of the Louvre Hotel, open the principal public rooms, consisting of a *salle-à-manger*, smoking-room, reading-room, banqueting-room, and three large *salons*, serving as *restaurants*. The decoration of these apartments is exceedingly rich and tasteful. The *salle-à-manger*, which is circular, and as large as many theatres, is covered with a domed glass roof, supported by carved figures, while the sides are adorned with red scagliola columns, in two tiers, alternating with mural paintings and mirrors of gigantic proportions. A telegraphic system entirely supplies the place of all bells, and not only despatches messages over Europe, Asia, and Africa, but takes your place at the theatre at any moment.

EXHIBITION BELLS.—Showing as it does the spirit of our colonies, we may mention that the peal of eight bells exhibited by Messrs. Warner at the International Exhibition have been purchased for the cathedral at Auckland; New Zealand.

NEW SUBSTITUTE FOR SILVER.—Mr. Trauluc, of Nismes, has recently proposed, as a substitute for silver for various uses, a white alloy, which, according to the *Cosmos*, has the property of resisting vegetable acids. It is formed of 375 parts of Banca tin, 55 nickel, 50 regulus of antimony, 20 bismuth.

A SOCIETY OF SCULPTORS.—A meeting was held at the rooms of the Architectural Society, in Conduit-street, on Wednesday evening in last week, for the purpose of inaugurating a new society, to be called "The Society of Sculptors of England." The chair was taken by Mr. James Edmeston, and resolutions to the proposed effect were passed.

STOPPAGE ON A TRAMWAY.—At Darlington, one of the street railway cars coming from the station was brought to a "dead lock" in Northgate, and kept there for about half an hour, by two manure carts, the horses facing each other, while the drivers contended each for the right. At length the car-conductors returned in the direction from whence they had come. Such a contingency only shows the desirableness of having tramways with cars not limited to the grooves, but capable of running either off or on. All difficulty might thus be obviated.

DINNER TO MONSIEUR GALLAIT. — A dinner was given, at Willis's Rooms, King-street, St. James's, to Monsieur Gallait, the distinguished Belgian painter, on Friday, the 18th of July; Earl Granville, in the chair. A goodly number of leading artists attended. The chairman spoke admirably, as did Mr. Gallait, Baron Taylor, and others. It has been felt that the dinner should have taken a wider form, and been given to foreign artists generally. Horace Vernet, Henry Leys, and many others have been in London. Honour is eminently due to Mr. Gallait; but the dinner, nevertheless, was a mistake.

GARDENS IN TOWNS.—The Bill for the protection of gardens or ornamental grounds in cities and boroughs, which has now reached the Commons, received considerable alterations in the course of its progress through the House of Lords. It is a Bill of some importance to many persons. It provides, as it now stands, that the local authorities are to take charge of any enclosed garden or ornamental ground set apart in any square, &c., for the use of the inhabitants thereof, where those who have the care of it have "neglected to keep it in proper order," or where, from want of any board of management, it has been neglected.

THAMES EEBANKMENT BILL —The select committee of the House of Lords, to which was entrusted the examination of the Thames Embankment Bill, met on Wednesday and passed the preamble, thus setting aside the Duke of Buccleuch's claim for consideration. They struck out clauses 9, 33, and 36. Clause 9 ordered that the Metropolitan Board of Works should not construct the road between the east side of Hungerford-bridge and Wellington-street until the other works were completed: clause 33 gave to the first Commissioner of Works the power of vetoing buildings proposed to be erected on the lands fronting the river; and clause 36 gave power to the Board of Works to sell surplus land.

OUR BEST DEFENCE, THE RAIL.—Sir Frederick Smith, in his speech against the Fortifications Bill lately, said, "Some years ago he was employed by the late Sir R. Peel to make inquiries as to the power of moving troops by railway. He consulted Mr. Laing, chairman of the Brighton Company, and Mr. M'Gregor, chairman of the South-Eastern; and those gentlemen told him that, if an invasion were at all possible, they would undertake to provide the means of taking down 40,000 men in three hours to any point of the coast. And, even if a French army were to land at Plymouth or Portsmouth, it would never dream of sitting down before either place. In such a position it would be exposed to attack both in flank and rear, and would either be captured or cut to pieces." A few years since it was proposed in our columns, as well as elsewhere, that the otherwise less defensible parts of our coasts might have railways run along them for facility of transport of troops; and it is probable that, if a portion of the heavy cost of fortifications were expended in railway works, the money would be laid out to greater advantage than now, as regards the coast defence of the country; while such works would be looked upon with more satisfaction than costly fortifications in a time of peace.

LEAMINGTON CHURCH COMPETITION.—The design of Mr. John Cundall, architect, of Leamington and London, has been selected by the committee, for the completion of the above church, at an estimated outlay of 10,000*l*.

BUILDERS AND TENDERS.—Sir: Having been written to, to tender for some works by eminent City architects, we sent in an estimate, and were told not to attend the day of opening. In answer to a note from me, they say it is not usual with them to disclose the various amounts of tenders, but we were unsuccessful. Is this, sir, *quite* a satisfactory mode of conducting such proceedings? VERAX.

*** Certainly not. Builders have these matters in their own hands, and should make proper stipulations.

POMPEII.—Letters received by Professor Zahn from Naples and Pompeii say:—"In Pompeii the excavations are zealously carried on under a new Piedmontese contractor. In the latest excavations in a house in the immediate vicinity of the Casino of Signor dell' Aquila, a beautiful triclinium, with three richly-decorated walls and three pictures, was discovered. The first of these pictures represents the building of Troy by Neptune and Apollo; the second a drunken Hercules with numerous Cupids, who have disarmed him, and surrounded by several Fauns and Bacchantes; and in the third picture Vulcan shows Thetis the arms of Apollo, among them a shield, on which are represented the Zodiac, Apollo, and the nine Muses. The second picture, with the drunken Hercules, is said to be, as regards both drawing and colouring, one of the finest ancient frescoes yet known. Next to this triclinium is another chamber, the ground of the walls of which is black, with embellishments in the Egyptian style, and a number of small pictures. On the floor at the entrance of this house is the inscription, '*Salve Lucro.*' The next building is a tavern, with an inscription, and a painted elephant on the outer wall as a sign—the Elephant Inn."

RAILWAY MATTERS.—The report to the Secretary of State for India in Council on railways in India for the year ending 31st December last has been issued. It states that the total miles opened in India are 4,653½; and that the length opened during 1861 was 759¾. The length remaining to be finished, and probable extent in each year, are stated to be 1,181½ miles in 1862; 517¼ in 1863; 729 in 1864; and 617 in 1865; the report subsequently giving a total length remaining to be finished, of 3,044½ miles.——The railway round Paris, which has been hitherto exclusively confined to the conveyance of merchandise, was opened on the 15th for passengers. The line starts from Bercy, near the Pont Napoléon, and passes over the Lyons Railway. It afterwards passes over the market gardens of Saint-Mandé, crosses the Vincennes Railway, cuts the Avenue of Bel-Air, and traverses the Grande Avenue of Vincennes, and thence reaches the station of Charonne. It passes under the heights of Père-Lachaise through a tunnel of 1,060 mètres in length. On leaving the tunnel, the line goes under the high road of Menilmontant, and reaches the station of the Rue de la Mare. It next passes through another tunnel, 1,100 mètres long, under Belleville, and arrives at La Villette. On leaving that station, it crosses the Rue d'Allemagne, the canal, and the Rue de Flandre, over viaducts; and thence proceeds to the station at Batignolles, which is the extent of the line at present opened for passengers. The distance is performed in thirty minutes. The line will be hereafter extended to Ivry.

CASTLEFORD.—The foundation-stone of a new Congregational church has been laid at Castleford, a place which of late years has greatly increased in population. The church is in the Early English style of architecture, and its site is in Carlton-street, a central place in the town. It will accommodate about 700; and its cost, and also of the schools at the back, will be about 2,000*l*., of which 1,100*l*. have been promised; 200*l*. being given by Mr. Titus Salt, of Methley Park. The architect is Mr. J. Hogg, of Halifax; and the contractors are Messrs. Barstow & Sons, of Pontefract.

TENDERS.

For repairing and altering the parsonage house of St. Paul's, Bunhill-row. Mr. E. Christian, architect:—

Jackson & Shaw	£960	0	0
R. Whiltshire	940	0	0
Pickering & Son	939	0	0
Brown & Robinson	897	0	0
Wells	890	0	0
Rhodes & Roberts	773	0	0

For the erection of a warehouse, 69, Holborn-hill, for Messrs. R. Lloyd & Sons. Mr. W. P. Griffith, architect.

Ebbage	£490	0	0
Partridge	489	0	0
Little	487	0	0
Fowler (accepted)	452	0	0

For new ragged schools, Ogle Mews, St. Marylebone, for Sir R. W. Carden and others. Mr. W. P. Griffith, architect:—

Little	£1,089	0	0
Bernister	950	0	0
Maears	943	0	0
George	937	0	0
Partridge	932	0	0
Fowler	927	0	0
Ebbage (accepted)	909	0	0
Knapp	865	0	0
Richards	793	0	0
Miny	770	0	0
Munro	770	0	0

For new Congregational chapel and schools, at Sawbridgeworth, Essex. Messrs. Poulton & Woodman, of Reading, architects. Quantities supplied:—

Perry	£1,660	0	0
Dickenson	1,595	0	0
Burton (accepted)	1,579	0	0

For the additional buildings for female patients at the County Lunatic Asylum, Brentwood, Essex. Mr. Henry Strett, architect:—

Hammond	£6,497	0	0
Trollope & Son	6,450	0	0
Rayner & Runacles	6,210	0	0
Brown	6,200	0	0
Brown & Robinson	6,157	0	0
Maurs	6,150	0	0
Jackson & Shaw	5,506	0	0
Rider	5,307	0	0

For building St. Ann's parsonage house, at Congresbury, Somerset. Mr. Norton, architect:—

Hartree	£2,164	0	0
Hughes	1,882	0	0
Wall & Hook	1,793	0	0
Palmer (accepted)	1,650	0	0

For building St. Ann's Church, at Congresbury, Somerset. Mr. Norton, architect:—

Hartree	£3,614	0	0
Wall & Hook	3,246	0	0
Hughes	2,870	0	0
Palmer (accepted)	2,780	0	0

For a house in Gloucester-crescent, Regent's-park. Messrs. Elmslie, Franey, & Haddon, architects:—

Manley & Rogers (accepted)	£615	0	0

For Wesleyan Chapel and boundaries, Compton-road, Wolverhampton. Mr. George Bidlake, architect:—

Baker	£4,460	0	0
Sims	3,916	0	0
Makepeace	3,800	0	0
Palmer	3,498	5	0
Bownter	3,400	0	0
Hartland	3,400	0	0
Addenbrooke	3,382	6	6
Cockerill	3,381	0	0
Burkitt	3,359	0	0
Horsman	3,345	0	0
Trow & Sons (accepted)	3,105	11	2

For farm buildings, at Wittersham, Kent, belonging to the Rev. E. H. M. Sladen. Mr. W. King, architect:—

Jones	£989	0	0
Bourn	870	0	0
Steddy & Co.	840	0	0
Comfort	756	10	0
Judge	721	0	0
Peters	700	0	0

For new bank, Watford, Herts. for the London and County Bank. Mr. Fred. Chancellor, architect. Quantities supplied by Messrs. Curtis & Son:—

Winfield	£2,503	1	0
Elliott	2,489	0	6
Martindale	2,384	10	6
Watson	2,355	0	0
Waterman	2,275	0	0
Richardson	2,200	0	0
Manly & Rogers	2,155	0	0
Bryant	2,143	0	0
Woodbridge	2,098	0	0
Tracey & Co.	2,050	0	0
Bromwich	2,023	0	0
Allen	2,000	0	0
Savage & Son	1,995	0	0
Boddington	1,960	0	0
J. Palmer	1,927	0	0
Rudkin	1,925	0	0
W. Palmer	1,900	0	0
Greenwood	1,900	0	0
Simms	1,898	0	0
Hassuidge & Son (accepted)	1,897	0	0
Arnold	1,875	0	0
J. Coker	1,710	0	0

For house and stabling at Beckenham, for Mr. W. Whitmore. Mr. H. Currey, architect. Quantities supplied by Messrs. Welch & Atkinson:—

	House.	Stables.	Total.
King & Co.	£3,220	£674	£3,894
W. Higgs	2,970	555	3,525
Nicholson	2,915	530	3,445
Downs*	2,896	534	3,430

* Accepted.